United States-German Economic Survey 1981

Seventh Annual Edition

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Deutsch-Amerikanisches
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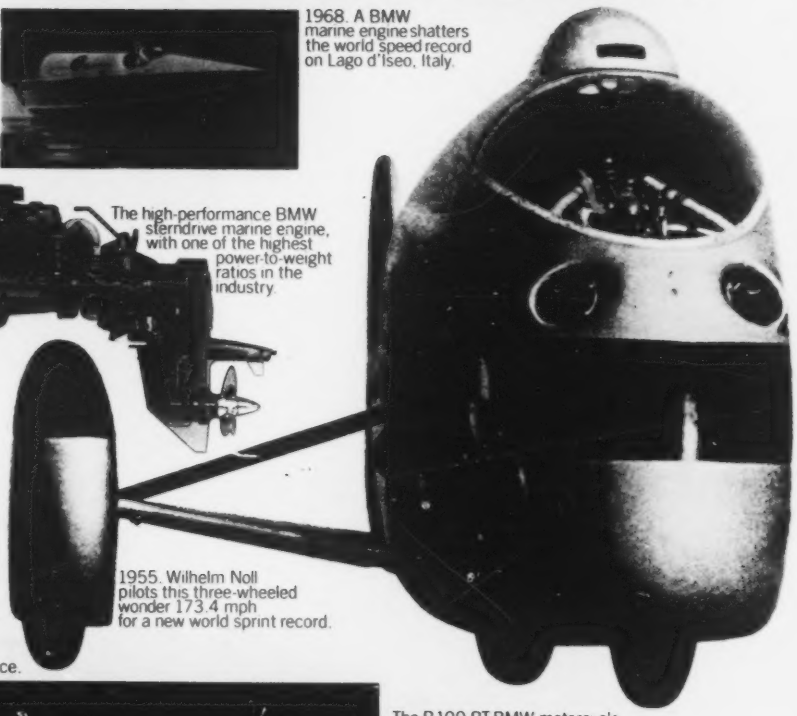

1955. Wilhelm Noll pilots this three-wheeled wonder 173.4 mph for a new world sprint record.

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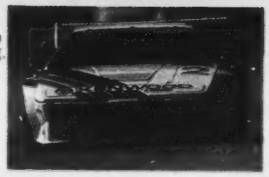

The BMW M-1 continues to break records in international racing.

The remarkable BMW/GTP. A 200-mph race car that could very possibly be a forerunner of BMW passenger cars.

1938. A team of BMW 328's takes first, second and third place at the Italian Mille Miglia.

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United States–German Economic Survey 1981

SEVENTH ANNUAL EDITION

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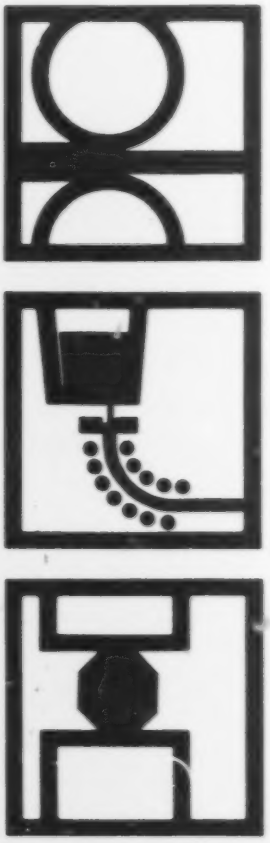

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The Turbodiesel idea is no longer new or exclusive to Mercedes-Benz. Mercedes-Benz Turbodiesels simply outpower every other diesel automobile, turbocharged or otherwise, that you can buy today.

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You can pull out and flash past slower vehicles. You feel no lag on hills. Throttle response even in the middle speed range is crisp.

The car meanwhile burns less fuel than a normal five-cylinder Mercedes-Benz diesel. It is docile where other performance cars (and many of today's gasoline-powered cars) can be balky. It doesn't smoke like a tramp steamer as it climbs long grades. On frigid mornings it can fire up in seconds. It never needs even a conventional tune-up.

If you termed this the most enlightened form of automotive power for the eighties, Mercedes-Benz would not strongly disagree.

Oil-cooled pistons

In Turbodiesel form, nearly half of the renowned five-cylinder Mercedes-Benz diesel engine's key internal components are replaced by new and more rugged parts.

Deep in the base of the engine block, a series of tiny nozzles sprays *jets of oil* into the pistons to help cool them as they work.

Not even the Turbodiesel's transmission is the same. It is a compact four-speed hydraulic wizard of an automatic, a torque converter device so quick that it can shift gears in 1/10th of a second, so smooth that many shifts are imperceptible.

45 percent more pleasurable

The 300 D Sedan is not the largest or the costliest Mercedes-Benz Turbodiesel, but its superb new ratio of power to weight makes it close to the quickest. Imagine the effect on a 3585-lb automobile of 45 percent more power–paid for with less than *five* percent more weight.

Imagine the effect of this extra performance on a nimble-handling car already second to no sedan, foreign or domestic, in roadholding prowess.

The 300 D remains at the same time an ideal family automobile, conveying five adults within one of the more intelligently designed and appointed cabins on wheels. Almost every reasonable amenity already exists in the 300 D–without consulting an option list.

Turbodiesel performance in the 300 CD Coupe is icing on a rich cake. With its two-plus-two coupe format and its pronounced sporting flavor, the 300 CD already ranked as an exotic Mercedes-Benz. But no mere boulevardier: a taut 106.7-inch wheelbase and precise reflexes help this suave machine to excel in hard, sustained, nip-and-tuck driving.

These two models fit into the Mercedes-Benz Turbodiesel price range just below the 300 TD Station Wagon, which in turn stands below the 300 SD Sedan. Sumptuously spacious, almost eerily quiet-running, clad in its aerodynamically advanced body, that remarkable automobile occupies the summit of modern diesel passenger car design.

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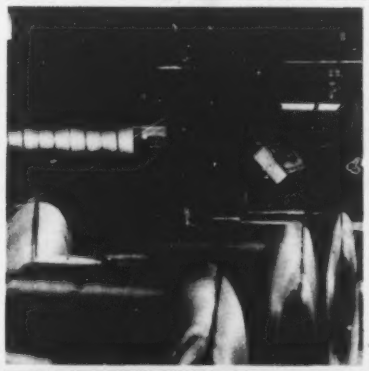

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PREFACE

The seventh edition of the United States-German Economic Survey appears at the conclusion of a year which has witnessed a shrinkage in world trade, in both nominal and real terms, for the first time since 1958. By current estimates, the contraction will be serious, something on the order of 5 percent in current dollars and 3 percent measured in 1975 dollars. This drop is all the more sobering when it is contrasted with the compound annual growth of 20.5 percent registered in the 1970's. To be sure, this statistic is a bit misleading since it also reflects artificial growth from high inflation spurred by rising oil prices.

Nevertheless, the falloff in world trade also derives in large measure from the impact of high interest rates and the economic slowdown in the major industrial countries. Viewed against this background, the expansive trend in trade relations between the United States and the Federal Republic assumes an even more positive complexion. According to German statistics, U.S. exports to Germany in January-September 1981 rose by 9.7 percent over the first three quarters last year, while German shipments to the United States leaped by 13.7 percent. This gives the United States a surplus so far this year of a little less than DM 3 billion against a surplus of DM 3.3 billion last year. Over and above the growth registered by both partners, it should be noted that surpluses and deficits in commercial exchanges between our two countries have shifted at regular intervals over the years, but never to a degree that poses painful disequilibrium. This in itself represents a major and rare element in true free trade: commercial flows from one partner to another should not become so persistent and one-sided as to threaten the health of the other's external accounts.

On its most meaningful level this publication should serve as an open forum for the exchange of opinion and analysis. We attempt, successfully we hope, to present a substantive dialogue between leaders in government and the business communities in the U.S. and Germany on subjects of topical interest and emerging significance. From the public sector, we are honored to present the views of the German Minister of Economics and three leading figures in the Reagan Administration. Not least of all, we would hope that the articles on telecommunications, robotics, and the diesel engine will add some perspective as well as reflect the eminent role of our two nations in the development and application of high technology.

In conclusion, I take this opportunity to express my appreciation to the distinguished American and German authors who have given so ably and generously of their time. The quality and breadth of their contributions to this volume represent, in my opinion, the essence of the U.S.-German business relationship, which derives from and will thrive upon a mutuality of interests and dynamism. This can only bode well for the future growth of exchanges in goods and services between our two countries.

Werner Walbrol
Executive Director
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December 1981

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The View from Bonn: World Trade and Growing Protectionist Tendencies

by Dr. Otto Graf Lambsdorff
Federal Minister of Economics

The expansion of the multilateral world trade system in the postwar era has proved to be a powerful motor for the improvement of the standard of living almost everywhere in the world. The recognition even by David Ricardo that a free international exchange of goods and services increases the prosperity not only of individual countries but of all countries involved is impressively supported by the available data. The principle of the international division of labor and the thesis of comparative cost advantage thus legitimately finds its application in modified form within the framework of the General Agreement on Trade and Tariffs, the OECD and, in terms of area, is concentrated in the various economic and free trade zones.

The extent to which free trade principles in the meantime are still logically accepted or are to be evaluated as merely lip-service and, to some extent, are no longer considered timely is shown particularly in such areas as ours, which is burdened with significant politico-economic problems. The world economy is at present compelled toward fundamental structural changes and is confronted with serious macroeconomic imbalances, the solution to which may be found only gradually at present and in the foreseeable future as well. This is all the more so, as the politico-economic forum for action in the industrialized countries is at present constricted by a change of temporal parameters and significant accumulation of constraints in the use of means:(development of inflation, exchange rates and international interest rates, extent of state indebtedness, structural deficits in current accounts for goods and services, the consequences of reduced income resulting from oil prices, competition from Japan and the NIC's [non-industrialized countries].

The danger of social destabilization and the tendency to give in to deceptive short-term protectionist solutions in such a situation, although understandable, is unacceptable. Mainly the USA, the European Community, and Japan, too, which as leaders in world trade account for more than half of world exports and imports, have a special responsibility for

The United States, the European Community, and Japan, which account for more than half of world exports and imports, have a special responsibility for strengthening the multilateral world trade system.

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strengthening the multilateral world trade system. Despite the many decisive effects of international structural changes, the main task is to avoid irreparable harm to the world economic system.

Fending off protectionism

Despite much progress in liberalization in the wake of the Tokyo economic summit, the greatest danger today to world trade seems to be an expansion of state subsidy practices as well as the threat of an escalation of concealed restrictions and non-tariff trade obstacles that are not based on any effective international controls and are capable of spreading like a net. The possibilities of this continue to be great. They extend from voluntary, self-imposed export restrictions to orderly marketing arrangements, sectoral market organizations such as the world textile agreement, the European steel market, bilateral governmental agreements for guaranteeing raw materials, agricultural market regulations, strengthened export subsidies via reduced export credits, wrongly used measures against allegedly dumped or subsidized exports, export restrictions on raw materials and intermediate products, extending to the still-lacking agreement on a new protective clause codex in the GATT. The increasingly menacing gestures that would have to be resorted to as protective measures against further increases in imports or protective measures by a country, which would lead to retaliatory countermeasures, are also to be seen as signs of a growing protectionist mentality.

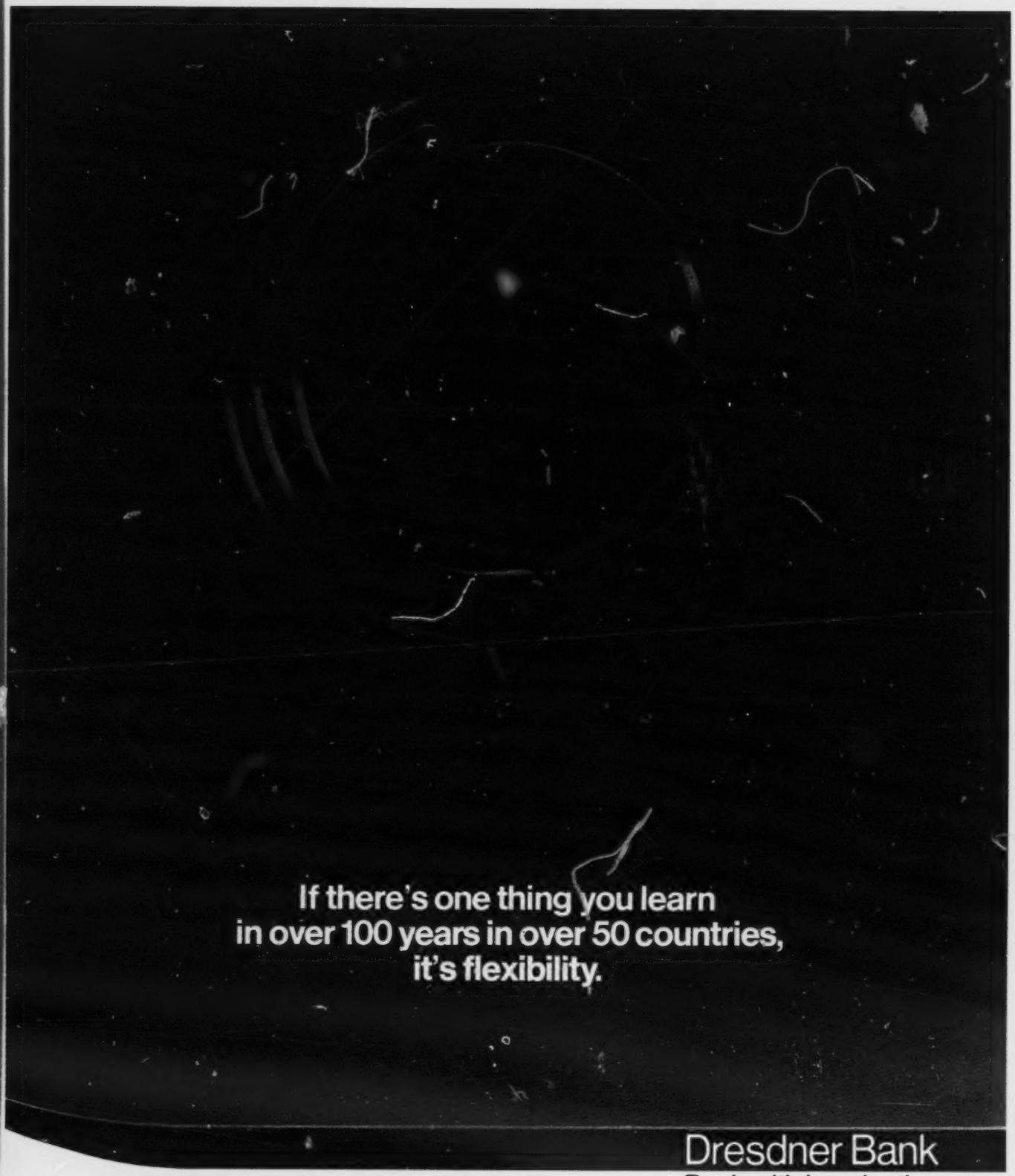
"It will be necessary to intensify the dialogue with Japan and to impress upon the Japanese the dangers of a one-sided, concentrated export strategy to free world trade."

Among the new beginnings of concealed protectionism is at present the increased use of the form of so-called bilateral self-restriction agreements, be it at the governmental or entrepreneurial level. The concomitant removal of the flow of certain products from the multilateral trade system weakens not only the control function of the General Tariff and Trade Agreement but, via a demand for bilateral clearing mentality, ultimately leads to a reduction of economic activity and hence to a reduction in the prosperity of the world economy. These basic considerations are also involved in the criticism of the self-restriction agreement concerning Japanese automobile exports to the USA, which confronted the German automobile market, the only large market that is still free, with the danger of the "spill-over effect." Dislocations were also feared by several member countries of the Economic Community, whose sales opportunities would be significantly reduced by a drastic penetration of the market by Japanese vehicles. The statement from the Japanese that it will not come to that therefore had a consoling effect.

"Despite the many decisive effects of international structural changes, the main task is to avoid irreparable harm to the world economic system."

It will, however, be necessary to intensify the dialogue with Japan and to impress upon the Japanese the dangers of a one-sided, concentrated export strategy to free world trade. Trade with Japan must not be a one-way street; the level of development achieved by the Japanese economy makes unavoidable a larger opening of the Japanese markets to our products. The automobile incident showed that problems could have been avoided if discussions had taken place within a larger framework (USA, Japan, European Community) before bilateral decisions had been made. For the purpose of reducing possible trade conflicts, in the future it should therefore be possible to hold ad hoc consultations. In order to avoid a negative impression among third-party countries, it must however be made expressly clear that such meetings cannot and should not replace the existing open procedure for settling disputes within the GATT.

With its imminent self-limitation agreement, the World Textile Agreement that is again to be negotiated at the end of 1981 is an alien element in an open world trade system. To be sure, the negotiations are progressing toward a World Trade Agreement, as an express exception to the GATT rules, under the auspices and control of the GATT. The clarity thereby gained does not, however, replace the necessity of political decisions, which must culminate in a socially necessary process of structural adaptation and a fair reconciliation of interests with the developing countries. For the transition, however, we will not be able to dispense with attempts to structure the process of structural adaptation as painlessly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ALL DIESELS ARE NOT CREATED EQUAL.

According to the EPA's 1981 Gas Mileage Guide, the Volkswagen Rabbit Diesel is America's overall fuel economy champ...again!

The 49-state, 4-speed transmission model recorded a phenomenal EPA estimated 42 mpg, 56 mpg highway. And the California version ranked first among all cars sold there, with an estimated 40 mpg, 54 mpg highway. (Use "estimated mpg" for comparisons. Your mileage may vary with weather, speed and trip length. Actual highway mileage will probably be less.)

Rabbit Diesels, however, aren't extraordinary cars just because they get incredible mileage. Rabbit Diesels get incredible mileage because they're extraordinary cars.

First, there's VW's "swirl chamber" diesel engine design. Unlike traditional "direct injection" diesels, in which fuel is sprayed directly into the engine's combustion chamber, in VW's diesel engine fuel is injected into special precombustion or "swirl" chambers in the cylinder head. This not only results in more even combustion and yields smoother running, but also reduces stress on vital components. Thus, VW could create a diesel that was both durable and light in weight—a diesel ideally matched to the compact, front-drive powertrain that endows any Rabbit with a layout that is a model of efficient space utilization.

No more than 25% of a Rabbit's overall length is taken up by gearbox, engine and cooling system. The bulk of the 155.3" between the bumpers supplies accommodations for a family of four with 14 cubic feet left over for belongings. The Rabbit's engine is mounted transversely to minimize front overhang and it's canted 15° to the rear, which permits a low, aerodynamic hoodline that also gives you a close-up view of the road ahead. All this is but some of what makes Rabbit Diesels extraordinary cars. There's also traditional VW quality and the year by year refinements that have earned the Rabbit Diesel its unprecedented string of firsts in the EPA mileage ratings.

For 1981, engine displacement has been increased to 1.6 liters. And what was already one of the speediest diesels around, now boasts 26% more torque and better than 8% greater horsepower. What's more, VW has developed an ingenious new fuel vent to help minimize water and water vapor (any diesel's nemesis) from entering the Rabbit's fuel system. Battery and alternator are now extra heavy duty for surer starts, and there are new gear ratios for the standard 4-speed and optional 5-speed transmissions that help make the Rabbit Diesel the best long distance runner per gallon of anything that you can put in the tank of any car you can buy. You see, while there are a lot of diesels to choose from these days, and they will all allow you to fill up on #2 fuel oil instead of gas, there is only one #1—the Volkswagen Rabbit Diesel.

VOLKSWAGEN DOES IT AGAIN

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as possible in the industrialized countries. The negotiations for the new WTA reveal, however, how the open world trade system can be endangered by granting exceptions to the regulations and the resulting deviation from the free market rules of allocation as a whole. Thus the danger in fact exists that the ability of the participating countries to compromise is overtaxed and, with a continuation of the agreement, an overlapping of national protective measures to other sectors is entirely within the realm of the possible. The drastically increased textile exports to the European Community by the USA, which in part worked to the disadvantage of the developing countries, have not only permitted the appeal for import monitoring to become audible within the European Community but have also strengthened the impression in the developing countries that they are disadvantaged within the system.

The drastically increased textile exports to the European Community by the United States have had the effect of increasing appeals in Europe for more import monitoring.

Areas of promise

The European agricultural market, removed from all necessities, is also certainly no example for the harmlessness of trade restrictions. There is no lack of friction with other countries. Apart from the ramifications to our trade with the industrialized nations in the realm of the industrial sector, the consequences in the readiness by the developing countries to be integrated into the world economy are undeniable.

The stagnation too in the almost two-year-long negotiations for the adaptation of the OECD consensus about export credits proves to be a hindrance to continual development of world trade without competitive dislocations—and this despite an urgent appeal to the world economic summit in Venice. If anything, the systematic deviations from the consensus have increased. A disintegration of the consensus would, however, unavoidably lead to heightened competition in subsidies and stipulations, with negative consequences for world trade far beyond the narrow realm of export financing. The intention expressed in the communique of the OECD Council of Ministers in June of this year to intensely continue negotiations and to conclude them by the end of the year is therefore to be applauded. The Federal Republic of Germany will, in this sense, increase its support within the European Community for these negotiations so the necessary compromise can be achieved—i.e., a market-conforming adjustment of the lowest interest rates and a start toward dismantling existing competitive dislocations.

Similarly, the ongoing work in the OECD in the area of trade in services should be energetically continued in order to achieve in this area, on a more long-term basis, progress in liberalization which improves international cooperation. GATT regulations concerning free transfer of products are of course not automatically applicable to the transfer of services. There is an abundance of limitations in the service sector that are based on the requisites of public order and security. More detailed analyses about the existing status of laws and of interest within the individual service sectors are therefore needed. Only because the US has developed a comprehensive administrative process does it have an overview from its perspective. All other countries, however, will require ample time to develop for themselves a corresponding level of information.

The question of a protective clause codex, which has to date not been resolved within the GATT realms and which is a problem that was excluded in the Tokyo economic summit, to an increasing extent burdens the relationship to developing countries. The demand by the European Community for permitting so-called selective protective measures is regarded not entirely unjustly by the developing countries as a potential protectionist instrument for guarding markets in the industrialized countries. In permitting selectivity, an effective international control would therefore have to be provided in order to prevent misuse.

An important partial aspect of the protective clause topic is the already-mentioned circumvention of GATT discipline by so-called voluntary export

"The European agricultural market, removed from all necessities, is also certainly no example for the harmlessness of trade restrictions."

restrictions. In contrast to other European Community member countries, we support an inclusion of these usually bilateral negotiations within the GATT discipline in order to avoid an erosion of GATT. The additional protective clause discussion will therefore be a criterion for the readiness and insight of the industrialized countries to assign a real function to free world trade in overcoming economic difficulties of the developing countries, and in this manner to diminish the potential for conflict in the North-South relationship.

In this respect, an earnest dismantling of trade barriers is altogether to be understood as a precondition and duty of the industrialized countries, at least for the time being, and certainly scaled according to country. In our opinion, therefore, the preferences for the ACP states provided for by the European Community in the Lomé II Agreement should be extended to all countries comprising the poorest developing countries. I would also consider it desirable if considerations by the US to develop a similar model for the Central American and Caribbean countries were realized. In doing so, it should be self-evident that altruistic action is not and cannot solely be the theme of development policy, but that the legitimate interest of the industrialized countries in development and expansion of future sales markets is involved.

"...an earnest dismantling of trade barriers is altogether to be understood as a precondition and duty of the industrialized countries, at least for the time being, and certainly scaled according to country."

In any case, it is striking in the analysis of the momentary world trade situation that significant protectionist dangers emanate from the tendency toward bilateral and sectoral attempts at a solution. This fear, also expressed by the GATT secretariat, can,

DEUTSCHE ZUSAMMENFASSUNG

Der Ausbau des multilateralen Welthandelssystems hat sich in der Nachkriegszeit als kraeftiger Motor fuer die Hebung des Lebensstandards fast ueberall in der Welt erwiesen. Das Prinzip der internationalen Arbeitsteilung und die These vom komparativen Kostenvorteil, finden in modifizierter Form ihre Anwendung im Rahmen des Allgemeinen Zoll- und Handelsabkommens (GATT), der OECD und raeumlich konzentriert in den verschiedenen Wirtschafts-und Freihandelszonen. Inwieweit die Freihandelsgrundsaetze noch konsequent akzeptiert, oder nur als Lippenbekenntnisse zu werten sind und zum Teil als nicht mehr zeitgemaess betrachtet werden, zeigt sich insbesondere in Zeiten, die mit erheblichen wirtschaftspolitischen Problemen belastet sind. Gegenwaertig sieht sich die Weltwirtschaft zu fundamentalen strukturellen Aenderungen gezwungen und mit gravierenden makrooekonomischen Ungleichgewichten konfrontiert, deren Loesung derzeit und auch in absehbarer Zukunft nur zoegernd vorankommen duerfte. Dies umso mehr, als der wirtschaftspolitische Handlungsspielraum in den Industrielaendern derzeit durch eine Veraenderung von Rahmendaten und erheblicher Kumulierung von Constraints beim Mitteleinsatz eingeengt wird. Dass bei einem solchen Szenario die Gefahr sozialer Destabilisierung und die Neigung, kurzfristigen protektionistischen Scheinloesungen nachzugeben, waechst, ist zwar verstaendlich, jedoch nicht akzeptabel. Eine besondere Verantwortung fuer die Staerkung des multilateralen Welthandelssystems haben in dieser Situation vor allem die USA, die EG and auch Japan, die als dominierende Welthandelspartner weit ueber die Haelfte der Weltaus- und -einfuhr auf sich vereinigen. Es gilt weiterhin, trotz aller einschneidenen Auswirkungen der internationalen strukturellen Veraenderungen, irreparable Schaeden fuer das Weltwirtschaftssystem zu vermeiden.

Dem Welthandel scheint heute die groesste Gefahr von einer Ausdehnung staatlicher Subventionspraktiken, sowie von einer Eskalation versteckter Beschraenkungen und nichttarifaerer Handelshemmnisse zu drohen, die keiner effektiven internationalen Kontrolle unterliegen und sich netzartig ausweiten koennen. Als Zeichen einer wachsenden Protektionismusmentalitaet sind u.a. die zunehmenden Drohgebaerden zu werten, dass bei weiteren Importsteigerungen Schutzmassnahmen ergriffen werden muessten, oder Schutzmassnahmen eines Landes zu Retorsionsmassnahmen fuehren wuerden. Unter den neuen Ansaetzen des versteckten Protektionismus findet derzeit die Form sogenannter bilateraler Selbstbeschraenkungsabkommen, sei es auf Regierungs- oder Unternehmensebene, in verstaerktem Masse Anwendung. Die mit einem solchen System verbundene Herausloesung bestimmter Warenstroeme aus dem multilateralen Handelssystem schwaecht nicht nur die Kontrollfunktion des Allgemeinen Zoll- und Handelsabkommens, sondern fuehrt ueber eine Foerderung des bilateralen clearing - Denkens letztlich zu einer Verminderung der Wirtschaftsaktivitaeten und damit des Wohlstands der Weltwirtschaft. Aus diesen grundsaetzlichen Ueberlegungen ruehrt auch die Kritik an den Selbstbeschraenkungsabkommen ueber die japanischen Automobilausfuhren in die USA, die fuer den deutschen Automobilmarkt, den einzigen grossen noch freien Markt, die Gefahr von "spill over-Effekten" brachten.

Es wird noetig sein, den Dialog mit Japan zu intensivieren und der japanischen Seite die Gefahren einer einseitigen, geballten Exportstrategie fuer den freien Welthandel eindruecklich vor Augen zu fuehren. Zur Entschaerfung moeglicher Handelskonflikte sollte es daher in Zukunft moeglich sein, ad hoc informelle Konsultationen einzuberufen. Um einen negativen Eindruck bei Drittlaendern zu vermeiden, ist jedoch ausdruecklich klarzustellen, dass solche Treffen nicht die bestehenden, transparenten Streitschlichtungsverfahren im GATT ersetzen koennen und sollen.

Das Welttextilabkommen ist mit seinen immanenten Selbstbeschraenkungsabkommen ein Fremdkoerper in einem offenen Welthandelssystem. Allerdings verlaufen die Verhandlungen zum WTA, als ausdrueckliche Ausnahme von den GATT-Regeln unter der Obhut und Kontrolle des GATT. Sprunghaft gestiegene Textilausfuhren der USA in die EG, die zum Teil zu Lasten der Entwicklungslaender gingen, haben nicht nur in der EG den Ruf nach

if development is not stopped, only end in a dismantling of the multilateral world trade system and thereby in a shrinking of world trade. Supporters of such solutions should be aware, however, that the present situation is the result of both accumulating as well as mutually influencing factors that have long been in effect to some extent. At issue, therefore, is not short-term momentary aid but basic answers.

Subject to rebuke in particular are those countries that, confronted with momentary difficulties, all too quickly resort to protectionism, thereby merely fending off existing problems, and undermine the dynamics of the economy and ultimately contribute with such a policy to an increase in inflation and unemployment.

In the battle against protectionism, I therefore welcome the intention of the GATT ministers at their next meeting to take a new initiative, which encourages hope for an effective political impulse for stronger GATT discipline and further efforts toward the liberalization of world trade; the statements of intention in the final communique from Ottawa support these expectations. In the further development of world trade, it will moreover be decisive that insight retain the upper hand among all parties involved in world trade, that a rejection of the basic principles of the multilateral trade system is as inconceivable an alternative as is unthinkable the abandonment of an economic system based on gold in favor of a barter economy, since both steps would lead to a reduction of economic activities, and ultimately thereby to diminished prosperity.

Despite isolated instances of protectionist sins, with these dangers in mind both of our countries have already done much in the past toward the requisite retention of open markets and in the future will continue jointly to support this position. With a policy of structural adaptation that is market-oriented, aware of stability, and is both openly conceived and internationally agreed on, we have an approach that is suited to overcome existing problems. ■

Importueberwachungen laut werden lassen, sondern auch in den Entwicklungslaendern den Eindruck verstaerkt, Benachteiligte des Systems zu sein.

Der europaeische Agrarmarkt ist, jenseits aller Notwendigkeiten, auch gerade kein Beispiel fuer die Unschaedlichkeit von Handelsbeschraenkungen. Auswirkungen auf die weltwirtschaftliche Integrationsbereitschaft der Entwicklungslaender sind unverkennbar.

Als Hemmschuh fuer eine kontinuierliche Entwicklung des Welthandels ohne Wettbewerbsverzerrungen, erweist sich auch die Stagnation in den fast zweijaehrigen Verhandlungen zur Anpassung des OECD-Konsensus ueber Exportkredite. Ein Auseinanderbrechen des Konsensus wuerde jedoch unweigerlich zu einem verschaerften Subventions- und Konditionenwettlauf fuehren, mit negativen Folgen fuer den Welthandel weit ueber den engeren Bereich der Exportfinanzierung hinaus. Die ebenfalls in der OECD laufenden Arbeiten auf dem Gebiet Handel mit Dienstleistungen sollten zuegig fortgesetzt werden, um auch in diesem Bereich laengerfristig zu Liberalisierungsfortschritten zu gelangen, die die internationale Zusammenarbeit verbessern. Im Dienstleisturgsbereich gibt es eine Fuelle von Beschraenkungen, die mit Erfordernissen der oeffentlichen Ordnung und Sicherheit begruendet werden. Es bedarf daher schon genauer Analysen ueber bestehende Rechts- und Interessenlagen in den einzelnen Dienstleistungsbereichen. Allein die USA verfuegen ueber einen solchen Ueberblick aus ihrer Sicht, weil sie einen umfangreichen Verwaltungsapparat aufgebaut haben. Alle anderen Laender aber werden geraume Zeit benoetigen, um sich einen entsprechenden Informationsstand zu schaffen.

Die im GATT-Bereich bisher ungeloeste Frage eines Schutzklausel-Kodex, ein in der Tokio-Runde ausgeklammertes Problem, belastet in zunehmendem Masse das Verhaeltnis zu den Entwicklungslaendern. Die EG-Forderung auf Zulassung sogenannter selektiver Schutzmassnahmen wird von den Entwicklungslaendern, nicht ganz zu Unrecht, als potentielles protektionistisches Instrument zum Schutz der Maerkte in den Industrielaendern gesehen. Um Missbrauch vorzubeugen, muesste daher bei Zulassung der Selektivitaet eine wirksame internationale Kontrolle vorgesehen werden. Ein wichtiger Teilaspekt des Schutzklauselthemas ist die bereits angesprochene Umgehung der GATT-Disziplin durch sogenannte freiwillige Exportbeschraenkungen. Im Gegensatz zu anderen EG-Mitgliedslaendern plaediert die Bundesrepublik Deutschland fuer eine Einbeziehung dieser zumeist bilateralen Verhandlungen in die GATT-Disziplin, um damit eine Erosion des GATT zu vermeiden.

In der Analyse der momentanen Welthandelssituation faellt jedenfalls auf, dass von der Tendenz zu bilateralen und sektoralen Loesungsansaetzen erhebliche protektionistische Gefahren ausgehen. Wenn diese Entwicklung nicht gestoppt wird, kann sie nur in einer Demontage des multilateralen Welthandelssystems und damit in einer Schrumpfung des Welthandels enden. Den Befuerwortern solcher Loesungen sollte jedoch bewusst werden, dass die gegenwaertige Situation das Ergebnis sich sowohl ueberlagernder als auch wechselseitig beeinflussender Faktoren ist, die zum Teil seit laengerem wirksam sind. Es geht deshalb auch nicht um eine kurzfristige Momenthilfe, sondern um grundlegende Antworten.

Mit der GATT-Ministertagung im naechsten Jahr ist eine neue Initiative ergriffen worden, die wirksame politische Impulse fuer eine staerkere GATT-Disziplin und weitere Bemuehungen um die Liberalisierung des Welthandels erhoffen laesst. Entscheidend ist, dass bei allen am Welthandel Beteiligten die Einsicht die Oberhand behaelt, dass eine Abkehr von den grundlegenden Prinzipien des multilateralen Welthandelssystems ebenso wenig zur Disposition stehen kann, wie eine indiskutable Rueckkehr von der Geld- zur Tauschwirtschaft, da beide Schritte zu einer Verringerung der wirtschaftlichen Aktivitaeten und damit letztlich zu Wohlstandsverlusten fuehren wuerden. Fuer die aus dieser Sicht erforderliche Offenhaltung der Maerkte haben die Bundesrepublik Deutschland und die Vereinigten Staaten von Amerika, trotz einzelner protektionistischer Suendenfaelle, in der Vergangenheit bereits viel getan und werden auch in der Zukunft weiter gemeinsam gefordert bleiben. Mit einer Politik der strukturellen Anpassung, die marktorientiert, stabilitaetsbewusst und offen konzipiert, sowie international abgestimmt ist, haben beide Laender eine Konzeption, die geeignet ist, die anstehenden Probleme zu bewaeltigen.

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The View from Washington: America Optimistic About Domestic and International Economic Recovery

by Donald T. Regan
Secretary of the Treasury

America's economic message is one of optimism and confidence. Under the firm leadership of President Ronald W. Reagan, our economic situation is under control, and we see the progressive restoration of economic, monetary, and fiscal health in the United States as our major contribution toward ecoonomic security for our trading partners in Germany, the rest of Europe, and throughout the world.

President Reagan recognizes the critical role of the United States and its dollar in the world economy, and he is determined to follow a consistent set of policies and goals to fight inflation, restore incentive, provide a basis for sustained growth, and ensure economic progress.

This Administration inherited an economy characterized by high inflation, rising unemployment, sluggish growth, diminished savings, and declining productivity. The Reagan Economic Program is a consistent, coordinated, and balanced long-term policy designed to reverse these adverse trends. To correct the fundamental problems, we have devised a program of fiscal restraint, incentive tax policy, slow but steady money growth, and regulatory relief to reduce the size of government and the costs to domestic business, while eliminating interference in the market place.

All parts of the program are anti-inflationary, and all elements are interrelated. Spending cuts release resources to our private sector; tax cuts provide our citizens the incentive to work, save, and invest; our monetary policy is designed to reduce inflation; and regulatory reforms promote productivity and private sector growth. The program will result, as well, in stabilization of the U.S. dollar.

Contrary to the beliefs of some of our European partners, most of whom are themselves caught in the strangling mesh of inflation and high deficits, high intereest rates in the United States are *not* a tool of the Reagan Administration. Many of our own industries, particularly housing, automobiles, thrift banking, and small business, suffer from high interest rates. These problems reflect previous economic policy excesses that promoted inflation and discouraged real savings.

We have every intention of reducing the budget deficit and eventually reaching balance. Projections of vastly expanded deficits are based on economic assumptions which we do not believe are reasonable and which do not allow for a more favorable economic performance to result from our program of restructuring incentives toward greater savings, investment and work effort generally.

Even if larger than projected deficits were to materialize, no direct relationships between budget deficits and inflation have been found. If deficits are not monetized, then price levels are generally unaffected. Similarly, relationships between interest rates and deficits are complex. If savings are boosted by the greater real returns now available and by incentives contained in the recent tax legislation, then deficits can be financed out of a larger savings pool even as resources are being shifted into formation of private capital.

A sound dollar and exchange rate stability

As far as international monetary policy is concerned, we feel it our duty as a major reserve and trading currency nation to achieve growth and price stability at home. We want the U.S. dollar to be respected, and we intend, through sound policies, to promote the health of the international monetary system to the benefit of our trading partners, as well as ourselves.

To that end, our exchange rate policy is one of non-intervention, except in instances of serious market disorder. We steadfastly believe in free markets; it should not be assumed that a relatively few government officals are better judges than the market of where exchange rates should be. The dollar's exchange value should, and will, be determined basically by U.S. economic performance relative to that of major foreign countries, and should be free to respond to market forces. U.S. domestic policy is designed to achieve U.S. price stability and restore growth and productivity, the fundamental determinants of a strong and stable dollar.

With today's instant communications and integrated international markets, a government is unable for long to hold the international value of its currency at an artificial level. If it tries, it will waste its international reserves and credit resources—at the taxpayers expense—and yet not be able to hold the rate in the end. We believe exchange rate stability will emerge in a world of low inflation, and we will not tolerate high inflation.

Reducing trade barriers

As to our international trade position, our policy reflects the fundamental market-oriented principles of our domestic economic program. We are vehemently opposed to protectionism.

Committed as we are to the long-term stability of both domestic and international markets, we are determined to pursue an open-market policy that avoids import restraint and other protective devices which perpetuate inefficient production and contribute to domestic inflation.

We seek to enforce our rights under the recent multilateral trade agreements, and are determined to work diligently with our European partners, and other nations, to reduce further the barriers to international trade. We expect other nations to maintain the same resolve.

Unfortunately, some of our trading partners have misread our decision to reduce current-year expenditures on export credits provided by the U.S. Export-Import Bank—a step taken to improve its management and eliminate unnecessary subsidies. For the past three years, most of us have sought to modify the Organization for Economic Cooperation and Development's International Arrangement on Export Credits which sets gudelines as to interest rates, terms, and down payments for official export credit programs. The minimum interest rates have changed only slightly since the Arrangement was established five years ago. Because market interest rates have risen in the meantime, the extent of credit subsidization permitted has risen as well.

The Reagan Administration does not intend to live permanently with either U.S. or foreign export credit subsidies, since they represent a transfer of money from the average taxpayer to the subsidized industry and foreign purchaser. We have set a high priority on our international negotiations on export credit subsidies, and hope to see significant progress this year. Our objectives are to raise the minimum interest rates of the International Arrangement on Export Credit and to provide for automatic rate changes that reflect future market trends.

We would also like to see the present minimum rates which are applicable to all curencies replaced by a system which reflects the vast differences in financial market conditions from curency to currency. To this end, we intend to ensure that the U.S. Export-Import Bank is funded in the years to come.

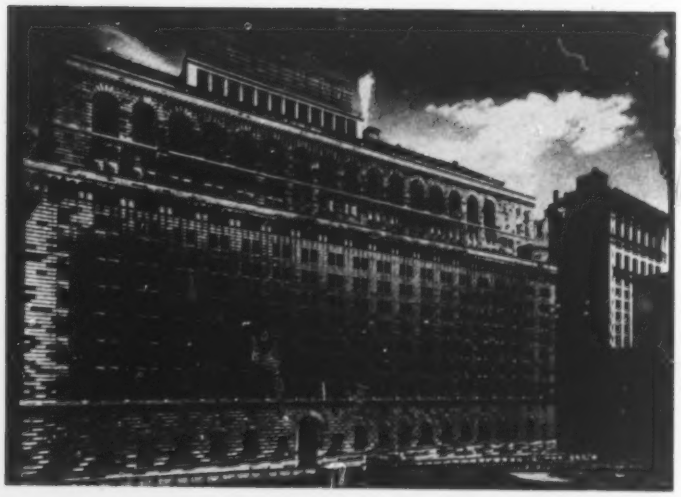
Assuming industrial world economic recovery, as we feel justified in doing, it is essential to all of us that we resist protectionism and cooperate to maintain an open world-trading system, while implementing the Multilateral Trade Negotiation Agreements.

Recent developments in the world economy, such as the sharp increase in energy prices and the emergence of new suppliers of manufactured products in world markets, have forced the pace of adjustment in our economies and created strong pressure for protective import measures. Successful management of these pressures is a strong factor in our mutual efforts to promote efficiency in our individual domestic economies, and an important element in strengthening Western cohesion in economic relations with the rest of the world.

"We have set a high priority on our international negotiations on export credit subsidies..."

We feel that a coherent response to changing world trade patterns and to their associated domestic adjustment pressures must begin with macro-economic policies that facilitate the operation of market forces and encourage non-inflationary economic growth. Competitiveness at home and abroad requires domestic policies that reduce inflation and stimulate research and development and investment.

Without the forward momentum of the now-completed Multilateral Trade Negotiations to focus the efforts of the major trading nations on trade liberalization, and with growing competition for more slowly developing markets, our nations will be tempted, increasingly, to resort to politically popular protectionist measures to reduce imports and increase exports as a means of maintaining employment and production at home.



The United States has not been immune to these pressures in the past, and the Reagan Administration is keenly aware of them. But, more importantly, we are aware of the fact that maintenance of open markets is absolutely essential to our pursuit of a strong and sound U.S. economy. It is our belief that restrictions on imports and subsidization of exports, rather then resolving domestic problems, only contribute to inflation, budgetary deficits, and current devaluations.

Providing a sound economic framework

To address our problems of escalating wages and prices, and stagnation of industrial growth, and to respond to the need to restructure because of new energy prices and international competition, we have devised economic policies of monetary restraint and reliance on the free interplay of market forces and mobility of labor and capital. The Reagan Administration's Economic Recovery Program provides the framework for the stimulation of sound, strong, long-term economic growth.

At the annual meetings of the International Monetary Fund and the World Bank which were held at the end of September, there was growing recognition that lasting progress and well rounded development of the global economy requires that each country must put its own house in order. Government efforts must give clear priority to bringing inflation under control; encouraging greater savings, investment and work; maintaining open markets and achieving effective balance of payments adjustment. The international financial institutions can play an important supplementary role in helping this process, but they cannot, and should not, do the whole job. The success of each nation in this effort will reinforce the prospects of a healthy economic future for all of us.

We see the economic, monetary, and fiscal recovery we are determined to achieve at home as our greatest contribution to European and world-wide economic security. ■

DEUTSCHE ZUSAMMENFASSUNG

Der amerikanische Praesident kennt die besondere Bedeutung des Dollars fuer die Weltwirtschaft. Er ist entschlossen, einer ausgewogenen wirtschaftspolitischen Linie zu folgen, um die Inflation zurueckzudraengen, die unternehmerische Initiative anzuregen, die Grundlagen fuer ein dauerhaftes Wachstum zu schaffen und den wirtschaftlichen Fortschritt zu sichern. Sein Programm bedeutet finanzielle Zurueckhaltung der oeffentlichen Hand, investitionsstimulierende Steuerpolitik, langsames, aber bestaendiges Wachstum der Geldmenge und Entlastung von behoerdlichen Reglementierungen, um so den Verwaltungsapparat zu verkleinern, die Kosten der heimischen Wirtschaft zu senken und staatliche Einmischung ins Marktgeschehen auszuschalten.

Im Gegensatz zur Meinung einiger europaeischer Partnerlaender der USA, die ihrerseits genug mit eigener Inflation und Staatsdefiziten zu kaempfen haben, sind hohe Zinsen allerdings kein Instrument, kein absichtlich eingesetztes Werkzeug der Regierung Reagan zur wirtschaftlichen Krisenbekaempfung.

Die amerikanische Regierung ist fest entschlossen, den Staatshaushalt nicht auf Dauer ueber wachsende Defizite zu finanzieren, sondern ein ausgeglichenes Budget anzustreben. Bei immer hoeherer Staatsverschuldung muessten alle Anstrengungen zur Stabilisierung der Wirtschaft, zu Wachstum und Schaffung bzw. Erhaltung von Arbeitsplaetzen vergeblich bleiben. Aber selbst wenn es vorerst groessere Defizite geben sollte, so wirken sie sich doch nicht inflationstreibend aus. Sie beeinflussen allerdings die Zinsentwicklung und fuehren hier zu komplexen Zusammenhaengen. Erhoeht sich die Sparleistung dank hoeherer Zinsen und damit berechtigter Erwartungen auf Realgewinne, und werden diese Erwartungen durch eine entsprechende Steuerpolitik flankiert, dann koennen die Defizite aus einem groesseren Spartopf finanziert werden; die zur Zinszahlung aufgebrachten Mittel tragen dann zur privaten Kapitalbildung bei.

Im Hinblick auf die Funktion des US-Dollars als Leit—und Handelswaehrung, betrachten es die Vereinigten Staaten als ihre Pflicht, im eigenen Land fuer Wachstum und Preisstabilitaet zu sorgen. Dazu dient unter anderem eine Aussenwirtschaftspolitik der Nichteinmischung, die nur in Faellen besonders ernster Marktstoerungen verlassen wird. Der Aussenwert des Dollars soll und wird grundsaetzlich vom Kraefteverhaeltnis zwischen der amerikanischen und auslaendischen Wirtschaften bestimmt; er soll auf die Marktkraefte frei reagieren. Angesichts der heutigen Kommunikationsmittel und integrierten Maerkte,

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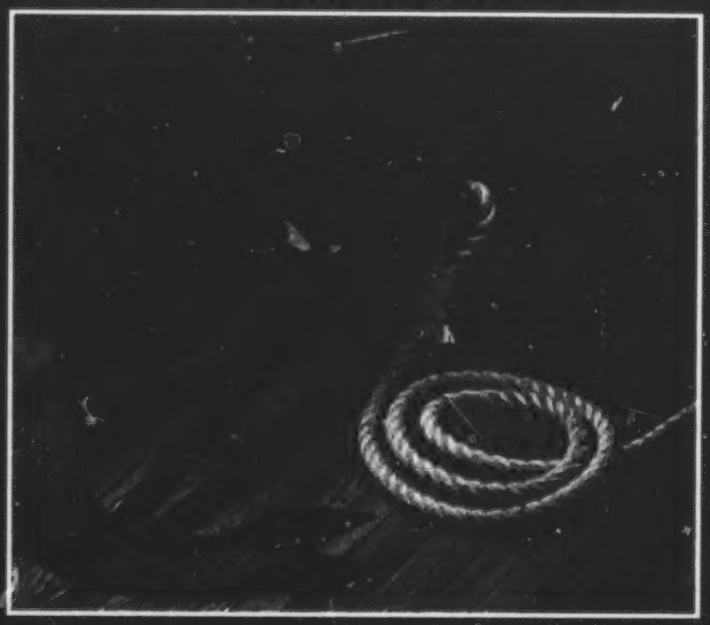

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laesst sich ein kuenstlicher Aussenwert fuer die eigene Waehrung auch nicht lange aufrechterhalten. Wer es dennoch versucht, wird nur seine Reserven vergeuden—zu Lasten des Steuerzahlers.

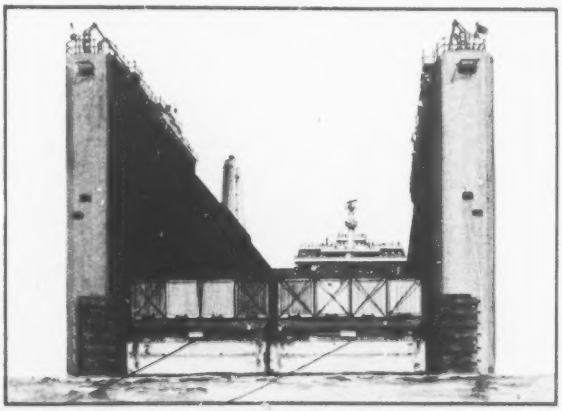
Die Regierung Reagan bleibt davon ueberzeugt, dass die Wechselkurse stabil bleiben, sobald die Inflation unter Kontrolle gebracht ist. Hohe Inflationsraten aber werden nicht mehr hingenommen.

Im Bereich der Handelspolitik hat sich die Administration in Washington dem Prinzip des freien Marktes verschrieben; sie ist deutlich gegen jeden Protektionismus. Ihre Rechte will sie im Rahmen der bestehenden multilateralen Handelsabkommen geltend machen und im uebrigen eng mit ihren europaeischen und anderen Partnern zusammenarbeiten, um zu einem weiteren Abbau bestehender Handelsschranken zu gelangen. Dabei wird allerdings Gegenseitigkeit erwartet. Bedauerlich sind in diesem Zusammenhang die Missverstaendnisse im Bereich der Exportkredite; seit drei Jahren schon wird hierzu im Rahmen der OECD nach einer Neuordnung gesucht. Die Regierung Reagan ist nicht bereit, eigene oder auslaendische Ausfuhrkreditsubventionen auf Dauer hinzunehmen. Diesem Thema wird hohe Prioritaet beigemessen. Die amerikanische Seite setzt sich hier fuer eine Erhoehung des Mindestzinssatzes ein und fuer automatische Aenderungen der Zinssaetze fuer Exportkredite, entsprechend den kuenftigen Marktentwicklungen. Ausserdem arbeiten die Amerikaner auf ein flexibleres System der Mindestzinsfestsetzung hin, das den grossen Unterschieden in den Marktbedingungen fuer die einzelnen Waehrungen flexibler Rechnung traegt.

Im Hinblick auf die bevorstehende wirtschaftliche Erholung muessen alle Handelsnationen protektionistischen Bestrebungen widerstehen und fuer eine Durchsetzung der Beschluesse der Tokio-Runde samt Folgeverhandlungen eintreten. Die steilen Erhoehungen der Energiepreise und das Auftreten immer neuer, wettbewerbsfaehiger Lieferlaender im Markt, haben zu lauten Forderungen nach Einfuhrschranken gefuehrt. Die Antwort liegt hier im makrooekonomischen Bereich, dort muss die Loesung auf die heimischen Anpassungsprobleme gesucht werden, denn nur so ist es moeglich, die Marktkraefte wirksam werden zu lassen und nichtinflationaeres Wachstum zu initiieren. Ohne neue Liberalisierungsanstrengungen in multilateralem Rahmen, werden die grossen Handelsnationen angesichts wachsenden Wettbewerbs der langsam erstarkenden Entwicklungslaender zunehmend versucht sein, nach protektionistischen Schutzmassnahmen zu greifen, um die Einfuhren zu senken, die Ausfuhren zu erhoehen, den Beschaeftigungsstand zu erhalten und die heimische Produktion zu bewahren. Die USA sind solch protektionistischem Druck gegenueber auch nicht immer standhaft geblieben, aber sie haben erkannt, dass die Offenhaltung der Maerkte absolut wesentlich ist fuer eine dauerhaft lebendige und gesunde heimische Wirtschaft.

Auf dem Jahrestreffen des Internationalen Waehrungsfonds und der Weltbank, Ende September 1981, gewann die Einsicht wachsende Zustimmung, dass kontinuierlicher Fortschritt und eine, wuenschenswert positive Entwicklung der Weltwirtschaft nur moeglich sind, wenn jedes Land sein eigenes Haus in Ordnung bringt. Regierungsanstrengungen muessen ueberall zuerst darauf gerichtet sein, die Inflation unter Kontrolle zu bringen, das Sparen zu foerdern, Investitionen zu ermutigen und Arbeit lohnend zu machen. Die USA sehen die wirtschaftliche Erholung, die sie bei sich eingeleitet haben und dauerhaft herbeifuehren wollen, als besten Beitrag zur wirtschaftlichen Sicherheit Europas und der Welt an.

Lykes Lines: The SEABEE Connection



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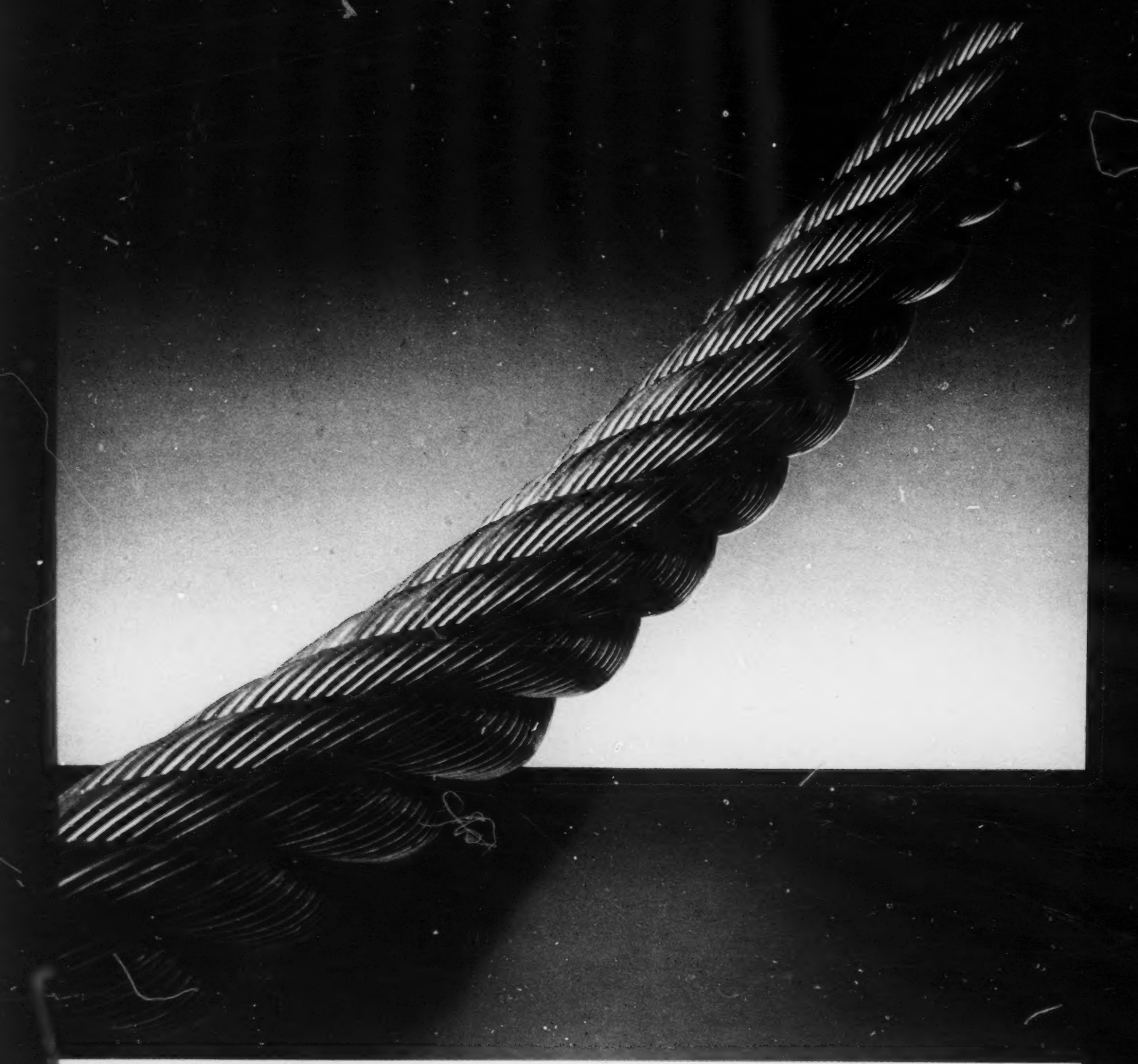

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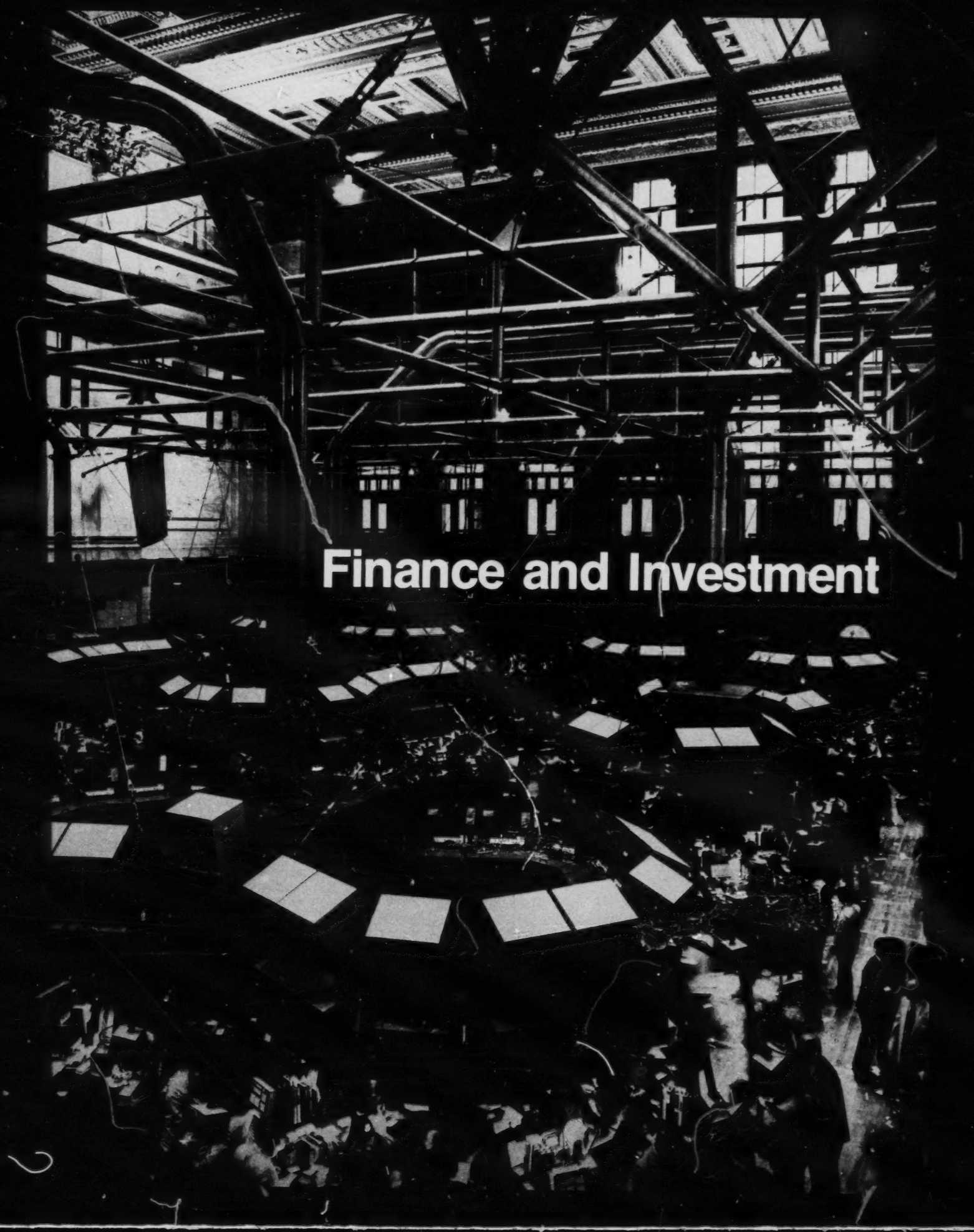

Finance and Investment

Free Trade: A Vital Component of the U.S. Economy

by Ambassador William Brock
The United States
Trade Representative

A strong U.S. economy is the primary goal of the Reagan Administration. Free trade, based on mutually acceptable trading relations, is essential to the pursuit of that goal.

International trade is, and will continue to be, a vital component of the United States' economy. The trade policy of the Reagan Administration will complement domestic economic programs which are designed to increase employment and output and reduce inflation.

One of the principal requirements of a strong U.S. economy is the maintenance of open markets both at home and abroad. The United States is more dependent on international trade than at any time in recent history. Exports generate higher real income and new jobs, and imports increase consumer choice and competition in a wide range of goods and services.

The United States is increasingly challenged not only by the ability of other countries to produce highly competitive products, but also by the growing intervention in economic affairs on the part of government in many such countries. We should be prepared to accept the competitive challenge, and strongly oppose trade distorting interventions by government.

"Exports generate higher real income and new jobs, and imports increase consumer choice and competition in a wide range of goods and services."

We will strongly resist protectionist pressures. Open trade on the basis of mutually agreed upon rules is in our own best economic interests, and is consistent with the Administration's commitment to strengthen the domestic economy.

We will give top priority to international trade. The President's Economic Recovery Program will strengthen industry and agriculture and improve the U.S. competitive position. Internationally, we will pursue policies aimed at the achievement of open trade and the reduction of trade distortions, while adhering to the principle of reciprocity in our trading relations. In seeking these fundamental objectives, we will initially focus on five central policy components.

The Administration's priorities

First, fundamental to any effective trade policy is the implementation of domestic economic programs that increase incentives to invest, raise productivity, and diminish inflation. The Administration's economic recovery plan provides the framework for

"...a high priority will be assigned to the reduction or elimination of domestic export disincentives."

achieving these objectives. The four component parts of the plan are: reduction of the rate of growth in government expenditures; reduction of marginal tax rates for individuals coupled with accelerated cost recovery for business; regulatory reform; and a consistent and predictable monetary policy.

While recent trends in U.S. productivity and investment have weakened our ability to compete abroad and eroded our industrial base at home, the economic recovery program submitted by the Administration can reverse this trend by improving incentives to invest in capital equipment as well as in research and development. Stronger economic growth is also important to facilitate the adjustment to changing international market conditions.

Second, a high priority will be assigned to the reduction or elimination of domestic export disincentives. Confusing, contradictory and unnecessarily complex laws and regulations adversely affect exports. The recent report to the Congress on Export Promotion Functions and Potential Export Disincentives identified three types of policies as the most significant export disincentives—the taxation of Americans employed abroad, the Foreign Corrupt Practices Act and export regulations and controls.

In this regard, the Administration supports the basic objectives of the Export Trading Company Bill currently before the Congress. The Administation also supports legislation to change the Foreign Corrupt Practices Act, and to reduce the income tax burden on Americans working and residing abroad.

Third, the U.S. and its trading partners have negotiated numerous international agreements to reduce barriers to trade and to establish common ground rules to limit trade-distorting practices. It is these agreements which constitute the backbone of the international trading system. They ensure that all nations can take advantage of the benefits of free trade while protecting their own interests.

In the latest round of the Multilateral Trade Negotiations, agreement was reached on new international codes of conduct covering a wide range of nontariff barriers. The implementation of these codes will be a complicated and time-consuming process. There remains before all countries the difficult task of applying the agreed principles and procedures to specific cases. In the process, fair resolution of the individual cases and a coherent system of discipline should develop. U.S. trade laws and international dispute settlement procedures provide the means to effectively enforce these international trade agreements and ensure reciprocity.

Our antidumping laws and countervailing duties are designed to neutralize or eliminate practices which distort free trade and which injure U.S. industry and agriculture. We regard these laws as essential to maintain the political support for a more open trading system.

We will insist that our trading partners live up to the spirit and the letter of international trade agreements, and that they recognize that trade is a two-way street. Accordingly, we will closely monitor the implementation of international trade agreements by all governments and we will make full use of all available channels for assuring compliance.

If all participating nations do likewise, if they actively pursue the implementation of the codes in a manner consistent with the goal of reducing trade barriers and trade distorting measures, they will advance their own interests by expanding trade opportunities.

"We will insist that our trading partners live up to the spirit and the letter of international trade agreements, and that they recognize that trade is a two-way street."

Fourth, developments in the world economy over the past few years, such as the energy crisis and the emergence of new suppliers of manufactured and agricultural products in world markets, have triggered major adjustments in the U.S. economy. Developments in the world economy over the foreseeable future will create the need for continuing adjustment.

Our policies toward the adjustment will take into account the fact that the economic vitality of certain sectors of our domestic economy is clearly essential to national security. Where other nations have a natural competitive advantage, U.S. industry must

"Import restrictions, subsidies to domestic industries, and other market distorting measures should be avoided."

either find a way of upgrading its own capabilities or shift its resources to other activities. Where the foreign advantage is based upon government subsidies and other trade-distorting practices, U.S. policy will be to enforce U.S. trade laws and to work to eliminate such practices.

Adjustment assistance and safeguard measures can ease problems of dislocation for firms and workers, but they do not of themselves effectuate adjustment. It is U.S. policy to place primary reliance on market forces to facilitate adjustment in affected industries.

Import restrictions, subsidies to domestic industries, and other market distorting measures should be avoided. A better solution to the problems associated with shifts in competiveness is to promote positive adjustment of economies by permitting market forces to operate. It will be critical to encourage, through international negotiations, all governments to adopt adjustment policies which do not have trade and investment distorting effects.

Fifth, one of the most difficult challenges we must face in seeking to achieve free trade is to develop appropriate responses to the growing intervention of governments in international trade. The Multinational Trade Negotiations achieved agreement on new codes covering a wide range of nontariff barriers and on a substantial reduction in tariffs. There are a number of issues, however, which were not adequately resolved in these negotiations.

Reducing government barriers

It is U.S. policy to deal with the individual problems through bilateral negotiating efforts in the short run, and to seek to negotiate new multilateral disciplines over the longer term. Our objective will be to reduce government barriers, both in the U.S. and abroad, to the flow of trade and investment among nations. The preparations for any new initiatives must be thorough and in some cases could be quite lengthy. Nevertheless, we will give priority attention to those issues described below.

Export Credits—We are currently faced by a growing subsidization of export credits by many of our trading partners. Though the nontariff agreements negotiated in the Multilateral Trade Negotiations deal with many aspects of such intervention, we will seek to renegotiate the existing international rules regarding official export credits. Our objective is both to substantially reduce, if not eliminate, the subsidy element, and to conform credit rates to market rates. The Export-Import Bank will target its export credits and guarantees where they are most needed to assist U.S. exporters facing subsidized foreign competitors.

Services—Trade in services is of growing importance in the United States. The services sector contributes substantially to our exports. Exports of services also are critical to exports of high technology and capital goods. Many service industries, such as the telecommunications, data processing/information, and engineering/construction industries are among our most competitive U.S. enterprises. Therefore, successful liberalization of barriers to U.S. service exports may pay a double dividend.

To continue a strong U.S. position in this sector, we are committed to addressing problems bilaterally with our trading partners, such as subsidized competition or restricted access to exports of American services. We also will work toward future multilateral negotiations that will expand access abroad and set effective rules and procedures for dealing with trade issues in services.

Trade-Related Investment Issues—U.S. trade policy must reflect the fact that trade and investment are intertwined inextricably. Investment policies can distort trade flows just as seriously as do tariffs and nontariff barriers. Trade-related investment incentives and performance requirements (e.g., export performance and local content requirements) have serious trade-distorting effects. They are becoming widely used by developing countries and even by some developed countries. We will deal with these

"It is U.S. policy to deal with the individual problems through bilateral negotiating efforts in the short run, and to seek to negotiate new multilateral disciplines over the longer term."

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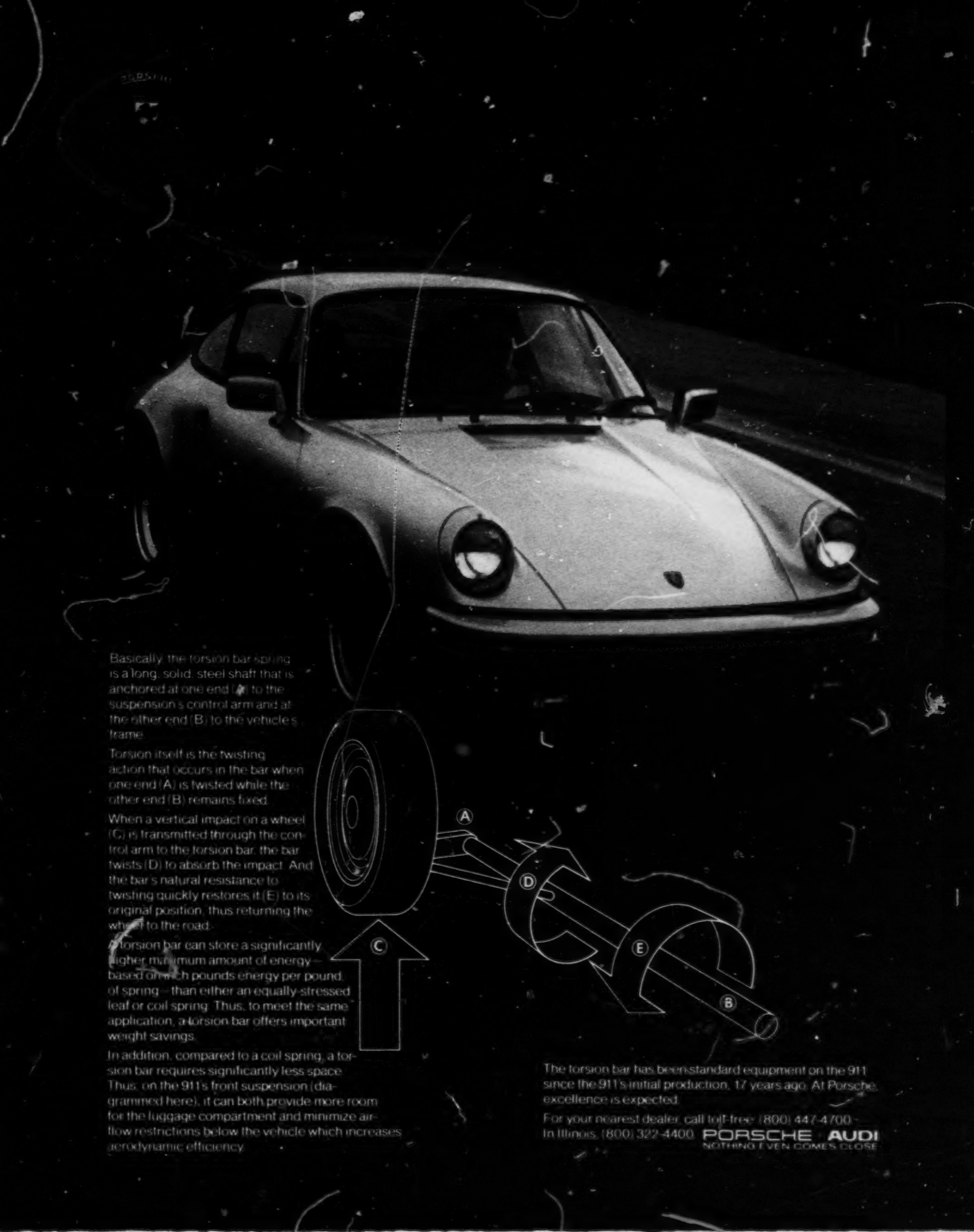

Basically, the torsion bar spring is a long, solid, steel shaft that is anchored at one end (A) to the suspension's control arm and at the other end (B) to the vehicle's frame.

Torsion itself is the twisting action that occurs in the bar when one end (A) is twisted while the other end (B) remains fixed.

When a vertical impact on a wheel (C) is transmitted through the control arm to the torsion bar, the bar twists (D) to absorb the impact. And the bar's natural resistance to twisting quickly restores it (E) to its original position, thus returning the wheel to the road.

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issues and over the longer term seek to negotiate new multilateral disciplines.

Trade with Developing Countries—An increasing proportion of U.S. exports of manufactured and agricultural products is to the developing countries. This growing market for our goods is vital to our economic well-being and to theirs. The developing countries' ability to import our products in turn is dependent on market access for their goods and on the availability of financing. We will consolidate and expand on the work begun in the MTN of integrating the developing countries more fully into the international trading system. The U.S. seeks to ensure that the benefits of differential trade treatment are directed increasingly to the poorer LDCs. We will carry out our trading dialogue with developing countries with the objective of making genuine trade progress and providing mutual advantages to all parties.

Trade with Non-Market Economies—United States trade with non-market economies has grown substantially in the last decade, although it should constitute a relatively small volume of total U.S. trade. While taking account of the primacy of national security interests, we need to develop approaches that bridge the fundamental differences between the market-oriented nature of the GATT system and the general absence of market forces in these countries. We will continue to monitor trade relations carefully to ensure that trade problems are dealt with expeditiously and that they serve overall United States interests.

Creeping Bilateralism—Concerns regarding the availability of oil and raw materials have persuaded an increasing number of countries to negotiate potentially trade-distorting bilateral deals, which include supply commitments for oil and raw materials, investment commitments in processing facilities, and import commitments for processed goods. When such arrangements are negotiated by governments and when they override multilateral trade commitments, they pose a serious threat to U.S. commerce and to the international trading system as a whole. We will initiate international discussions to limit the potential distortion of trade from such practices.

Competition Policy and Safeguards—There has been a tendency in recent years for a large number of countries to face import problems in the same sector. This has led to the simultaneous application of safeguard measures by a number of nations, creating the danger of a significant reduction in competition on a global scale. To the extent

some countries permit their firms to reach agreement with foreign firms to restrain trade, the potential erosion of competition globally is even more serious. Differences in national antitrust laws with respect to the treatment of international restraint agreements, moreover, give rise to inequalities in the standards applied to companies operating in the world marketplace. Increasingly, therefore, competition needs to be viewed from an international perspective. We will pursue these problems in international forums, including the GATT, in a fashion consistent with competitive principles.

Conclusion

A strong U.S. trade position must be and will be a national priority. Trade is a messenger of change in the world economy and of the need for adjustment in our own economy. We can shut our ears to the messenger through protectionism and avoid any adjustments for a while, but we will suffer in the long-run. Alternatively, we can respond to trade's messages of change by adopting forward-looking trade and economic policies with the result that our high standard of living is preserved and indeed improved.

The government can help create an environment conducive to efficient and profitable production. But it is private individuals and enterprises who have to take the initiative to seize economic opportunities.

At the recent Ottawa Summit all the heads of State pledged to resist protectionist pressures in the larger interests of achieving a strong open world economy free from inflation and unemployment. Trade is vital for the domestic well-being of all countries; the Federal Republic of Germany, the U.S.

"Trade is a messenger of change in the world economy and of the need for adjustment in our own economy."

"It is imperative that the U.S. and the Federal Republic of Germany provide the leadership in the free world that will add to an expanded trading system."

and the rest of Europe are no exceptions. It is imperative that the U.S. and the Federal Republic of Germany provide the leadership in the free world that will add to an expanded trading system. We must do so not simply because it is in our own economic interests but because this is a fragile world in which we live. We must find a way to weave the web of self-interest around our relationship. We must reach for all methods that we can to draw the several peoples of our two countries and the other countries of the world into a community of interest. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Autor stellt die Handelspolitik der Regierung Praesident Reagans dar. Er erlaeutert die Prinzipien, auf denen sie beruht und die Linie der USA fuer die bevorstehenden, internationalen Verhandlungen zum angesprochenen Bereich.

Eine kraeftige US—Wirtschaft ist das Hauptziel der Reagan Administration. Der freie Handelsaustausch, der auf annehmbaren Handelsbedingungen fuer alle Beteiligten beruhen muss, ist von wesentlicher Bedeutung fuer das Erreichen des gesteckten wirtschaftlichen Ziels. Der Aussenhandel war und ist ein wesentlicher Bestandteil der Wirtschaft der Vereinigten Staaten. Die Handelspolitik Praesident Reagans wird die binnenwirtschaftlichen Programme flankieren, mit denen Beschaeftigungsstand und Produktion in USA erhoeht und die Inflation bekaempft werden soll.

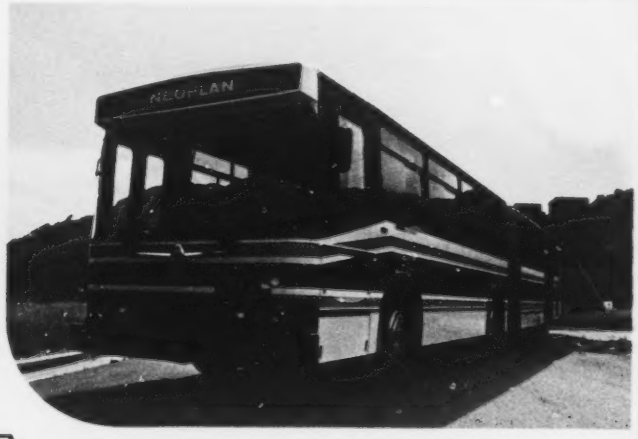
Eine der wesentlichen Voraussetzungen fuer eine starke US-Wirtschaft ist die Erhaltung offener Maerkte, sowohl im eigenen Land, wie in Uebersee. Die Vereinigten Staaten sind zur Zeit staerker auf den internationalen Handelsaustausch angewiesen denn je. Exporte fuehren zu hoeherem Einkommen und neuen Arbeitsplaetzen, Importe bereichern das Angebot fuer den Verbraucher und regen den Wettbewerb bei Guetern und Leistungen im grossen Umfang an. Die Vereinigten Staaten sehen sich herausgefordert, nicht nur durch die Faehigkeit anderer Laender, voll wettbewerbsfaehige Erzeugnisse herzustellen, sondern auch durch die Eingriffe in Wirtschaftsablaeufe, die von den Regierungen der genannten Laender in zunehmendem Masse ausgehen. Die USA sind entschlossen, protektionistischem Druck zu widerstehen. Sie werden eine Politik verfolgen, die darauf ausgerichtet ist, den freien Handelsaustausch zu erhalten, die bestehenden Verwerfungen zurueckzufuehren und das Prinzip der Gegenseitigkeit in den Handelsbeziehungen zu verwirklichen. Um ihr Ziel zu erreichen, wollen sich die USA auf fuenf zentrale Komponenten in ihrer Handelspolitik konzentrieren. Als erste Komponente einer wirksamen Handelspolitik nennt der Verfasser die Einleitung heimischer Programme zur Erhoehung der Investitionsanreize, zur Erhoehung der Produktivitaet und zur Bekaempfung der Inflation.

Eine zweite Komponente stellt die Beseitigung von exporthemmenden Vorschriften und Massnahmen in den USA selbst dar. Unklare, widerspruechliche und ueberfluessige Gesetze und Regeln koennen hier den Ausfuehrer entmutigen. Die Regierung ist daher bereit, den Zielsetzungen zu folgen, die mit dem Gesetz ueber die Export Trading Companies verfolgt werden. Die Regierung begruesst auch die Bemuehungen um eine Aenderung des Foreign Corrupt Practices Act und sie wird bemueht bleiben, die Steuernachteile abzubauen, denen sich Amerikaner ausgestzt sehen, die im Ausland arbeiten und wohnen. Eine dritte Komponente ist die Einhaltung der vielen internationalen Abkommen zum Abbau von Handelsbarrieren oder zur Begrenzung handelsstoerender Praktiken, denn es sind diese Abkommen, die das Rueckgrat des internationalen Handelssystems ausmachen; diese Abkommen stellen sicher, dass alle Nationen von den Vorteilen des freien Handels profitieren und dennoch ihre eigenen Interessen schuetzen koennen. Die USA haben das Instrumentarium, um die vereinbarten Massnahmen und Verfahren auch inkraft zu setzen. Durch Antidumping-Verfahren und Schutzzoelle koennen sie ihre Industrie und Landwirtschaft vor gezielten Stoerungen schuetzen. Sie werden darauf bestehen, dass ihre Handelspartner Geist und Buchstaben der internationalen Handelsabkommen einhalten und dass sie anerkennen, dass es sich beim Handelsaustausch niemals um eine Einbahnstrasse handeln kann. Die USA wollen daher das Inkrafttreten und die Beachtung internationaler Handelsregeln in anderen Laendern genauer als bisher beobachten und alle Moeglichkeiten ausschoepfen, um die Befolgung der vereinbarten Regeln bei allen Partnern durchzusetzen. Eine vierte Komponente ist der Zwang zur strukturellen Anpassung, ausgeloest durch die Energiekrise und das Auftreten neuer Herstellerlaender fuer Industrielle und Agrarprodukte auf den Weltmaerkten. In diesem Bereich wird sich die US-Politik vor allen Dingen auf die Marktkraefte verlassen, um die Richtung fuer die notwendigen strukturellen Anpassungen nicht zu verfehlen. Dabei soll

allerdings nicht uebersehen werden, dass es einige Wirtschaftsbereiche gibt, die von groesster Bedeutung fuer die heimische Industrie und fuer die Sicherheit der Vereinigten Staaten sind. Hier soll es gewisse Ruecksichtnahmen geben. Ansonsten wird gesagt, dass die US-Industrie dort der Auslandskonkurrenz weicht, wo sie nicht mehr wettbewerbsfaehig ist und auch durch Anpassung und Innovation nicht mehr wettbewerbsfaehig werden kann; dies soll allerdings nicht gelten, wenn der Handelsvorteil des Auslandskonkurrenten auf staatlichen Subsidien oder anderen marktverfaelschenden Faktoren beruht.

Einfuhrbeschraenkungen, Subventionen an die heimische Industrie und andere marktverzerrende Massnahmen, wollen die USA vermeiden. Sie wollen besonderes Gewicht darauf legen, alle Regierungen fuer eine Politik zu gewinnen, die ohne Manipulationen von Handel und Investitionsstroemen auskommt. Als fuenfte Komponente einer Handelspolitik nennt der Verfasser schliesslich die Notwendigkeit, den zunehmenden regierungsseitigen Eingriffen in den freien Handelsaustausch entgegenzutreten. Er uebersieht in diesem Zusammenhang nicht die Resultate der letzten Tokio-Runde, auch nicht diejenigen im Bereich der nichttarifaeren Handelshemmnisse. Eine Reihe von Fragen ist jedoch aus amerikanischer Sicht offengeblieben, oder in wenig befriedigender Weise behandelt worden. Hier sollen neue Anlaeufe genommen werden, die sich insbesondere auf folgende Bereiche beziehen:

- Exportkredite; die Subventionspraktiken der Handelspartner nehmen zu. Die Amerikaner wollen daher eine aktive Rolle bei der Anpassung des OECD—Konsensus ueber Exportkredite uebernehmen und dabei auf einer teilweisen Neuverhandlung bestehen. Die Export-Importbank soll ihre Kreditzusagen auf Faelle konzentrieren, in denen amerikanische Ausfuehrer im Wettbewerb mit (kredit-) subventionierten auslaendischen Wettbewerbern stehen.
- Dienstleistungen; Der Handel mit Dienstleistungen gewinnt wachsende Bedeutung fuer die Vereinigten Staaten. Der Dienstleistungssektor traegt wesentlich zu den Exporten der USA bei. Die Ausfuhr von Dienstleistungen ist wesentlicher Bestandteil der Lieferungen an moderner Technologie und an Anlagen. Viele Dienstleistungsindustrien, wie das Nachrichtenwesen, die Datenverarbeitung- und Uebermittlung, die Bau- und Anlagenindustrie gehoeren zu den besonders wettbewerbsstarken Zweigen der US-Wirtschaft. Daher kann eine erfolgreiche Liberalisierung besonders in diesem Gebiet gewinnbringend fuer die USA sein. Bi- und multilateral wollen die Amerikaner das Thema des subventionierten Wettbewerbs und der Einschraenkungen, denen sich der amerikanische Dienstleistungsexport gegenuebersieht, mit ihren Handelspartnern ansprechen.
- Handelsbezogene Investitionsfragen; die US-Handelspolitik soll der Tatsache Rechnung tragen, dass Handel und Investitionen untrennbar verbunden sind. Investitionssteuerungen koennen die Handelsstroeme genauso spuerbar stoeren, wie tarifaere und nichttarifaere Hemmnisse. In zunehmendem Mass bedienen sich die Entwicklungslaender neuer Vorschriften ueber handelsbezogene Investitionen, etwa im Bereich der Local-Content-Requirements bei im eigenen Land montierten Importprodukten. Hier werden die Amerikaner versuchen, auf laengere Sicht zu multilateralen Vereinbarungen zu gelangen.
- Handel mit Entwicklungslaendern; die USA benoetigen die dortigen Maerkte fuer ihre Industrie- und Agrarprodukte ebenso wie die Ent-



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wicklungslaender auf amerikanische Importe angewiesen sind. Um den Austausch zu ermoeglichen, muessen die Amerikaner ihren Markt offenhalten und Finanzierungsmodalitaeten bereitstellen koennen. Sie werden daher in den Folgeverhandlungen zur Tokio-Runde bemueht sein, die Entwicklungslaender noch staerker als bisher in das internationale Handelssystem einzubinden, insbesondere die aermeren der am wenigsten entwickelten Laender (LDCs). Der US-Handel mit den oestlichen Wirtschaften hat in den letzten zehn Jahren deutlich zugenommen. Unter Beruecksichtigung der nationalen Sicherheitsinteressen sollen hier Moeglichkeiten gesucht werden, wie die grundsaetzlichen Unterschiede zwischen der Marktorientierung im GATT-Bereich und dem Fehlen der Marktkraefte in den oestlichen Laendern ueberbrueckt werden koennen. Der amerikanische Osthandel soll sorgfaeltig beobachtet werden, damit sichergestellt bleibt, dass er den US-Interessen dient.

— Schleichender Bilateralismus; zunehmende Besorgnis ueber die Verknappung von Oel und anderen Rohstoffen haben eine Reihe von Laendern zu bilateralen Abkommen mit den Lieferanten bewogen, die dafuer Versorgungsgarantien abgeben. Derartige Abkommen bedrohen den US-Handel und das internationale Handelssystem als Ganzes, wenn sie multilaterale Verpflichtungen ueberlagern. Die USA sind entschlossen, eine internationale Diskussion zur Begrenzung der moeglichen Verwerfungen einzuleiten, die von derartigen Praktiken ausgehen koennten.

Wettbewerbs- und Schutzmassnahmen; in den vergangenen Jahren ist es mehrfach vorgekommen, dass bei mehreren Handelsnationen gleichzeitig Probleme im Warenbereich aufgetreten sind. Die ergriffenen Schutzmassnahmen haben zu Wettbewerbsbeeintraechtigungen gefuehrt. Auch haben einzelne Regierungen zugelassen, dass ihre Wirtschaft selbstaendig Einschraenkung der Handelsstroeme ausloest. Unterschiede in der Antitrust-Gesetzgebung haben darueber hinaus dazu gefuehrt, dass Wettbewerber bei ihrem Vorgehen auf ein und demselben auslaendischen Markt unterschiedliche Bedingungen im eigenen Land zu beruecksichtigen haben. Es ist daher notwendig geworden, dass der Wettbewerb aus internationaler Perspektive betrachtet wird. Hier ist beabsichtigt, die internationalen Foren, insbesondere das GATT, anzusprechen.

Die Bundesrepublik Deutschland und die Vereinigten Staaten von Amerika sollten gemeinsam die Fuehrung in der freien Welt bei der Ausweitung des Handelssystems uebernehmen. Dies ist nicht nur aus wirtschaftlichen Gruenden notwendig, sondern auch im Hinblick auf das empfindliche Gleichgewicht in der Welt. Beide Laender muessen gemeinsam nach allen Moeglichkeiten suchen, die eine Einbindung der eigenen Voelker und der Voelker der Welt in eine einzige Interessengemeinschaft ermoeglichen. Der Handel ist ein Vorbote der Veraenderung in der Weltwirtschaft und der Notwendigkeit zur Anpassung in unserer eigenen wirtschaftlichen Umwelt. Wir koennen unsere Ohren gegenueber diesen Boten verschliessen, etwa durch Protektionismen aller Art und fuer eine Zeit lang auch jegliche Anpassung verhindern; die Folge wird jedoch eine Notzeit sein. Andererseits kann man auf die Botschaften ueber bevorstehende Veraenderungen, die uns aus dem Handelsbereich erreichen, auch mit zukunftsweisender Handels- und Wirtschaftspolitik antworten, mit dem Ergebnis, dass der bestehende hohe Lebensstandard erhalten und noch weiter ausgebaut werden kann.

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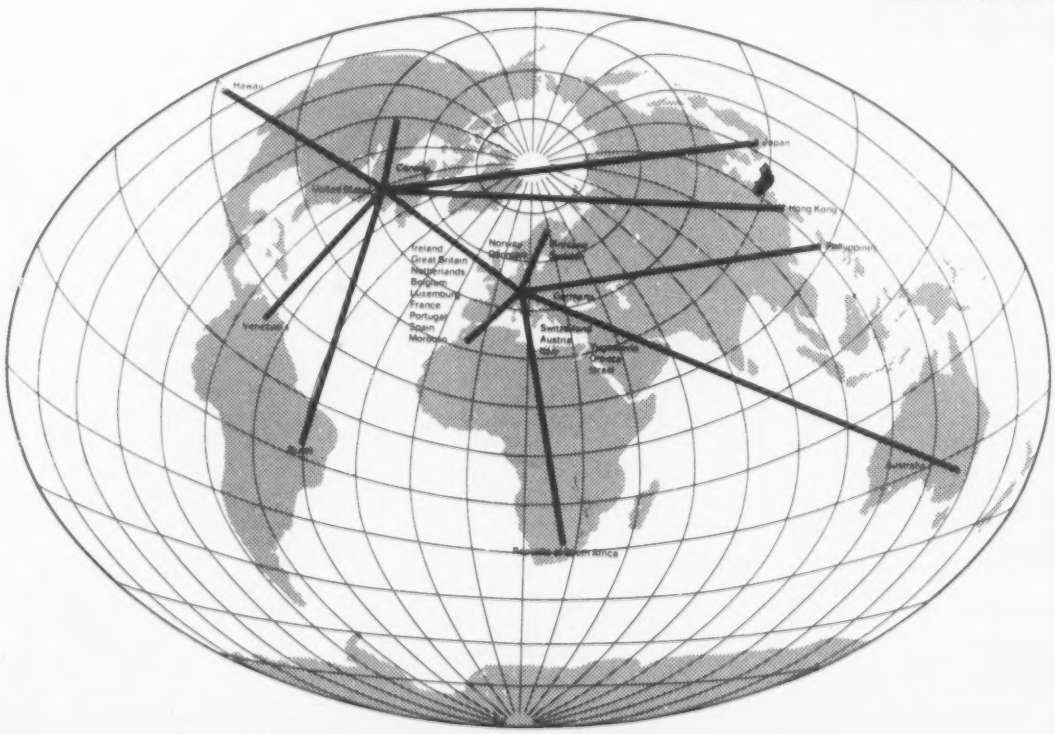

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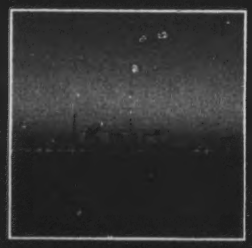

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- OFFICE JOINT VENTURES
  Total sq. ft. — 475,769
  Total Investment — $37,774,000
- LAND
  Total Acres — 2420.8
  Total Investment — $3,923,786
- COMMUNITY SHOPPING CENTERS
  Total sq. ft. — 1,395,081
  Total Investment — $41,320,700
- MID-MARKET MALLS
  Total sq. ft. — 993,985
  Total Investment — $38,024,000
- REGIONAL MALL EXPANSION
  Total sq. ft. — 535,136
  Total Investment — $10,000,000
- FREE STANDING K-MARTS
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  Total Investment — $51,189,000
- PENDING TRANSACTIONS
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America— the "Promised Land" for Real Estate Investment?

by Karl H. Casagrande
Senior Vice President
Deutsche Bank

There is talk of a "rush" into the dollar, triggered by high interest rates but also due to a growing dissatisfaction with the economic and political environment at home in Europe. The dollar exchange rate — especially vis-a-vis the Deutsche Mark — is again a topic in the daily news; this time, however, with a reversed trend — recovering from previous lows.

How "dramatic" is this move into the dollar? Take the figures available. German investments abroad from 1977 to 1980 (public sector excluded) amounted to DM 324 billion, of which DM 45.6 billion, or 14%, went to the U.S.A. During that same period, private purchases of real estate played a relatively minor role, coming to only DM 3 billion. But a comparison of the growth rates reveals an interesting fact. Whereas total private investments abroad expanded by 31% (U.S.A.: 161%) from 1977 to 1980, and portfolio investments by 26% (U.S.A.: 176%), new investments in real estate shot up by a total of 182%, while those in the U.S.A. almost quadrupled. These numbers — although still a relatively small part of total investments — prove the growing popularity of investments in U.S. real estate. But this still does not answer the question of whether the United States really is the "promised land" for real estate investments. For that the differences between the types of properties available for investment (from farmland to skyscrapers) are too great.

Take as an example the private housing sector: In the Friday editions of German newspapers the reader is offered a multitude of properties in the U.S.A. The highest profits are promised to those who participate in the development of residential properties. In such cases it is assumed that the apartments or town houses can be sold to the tenants realizing high gains after an initial phase of 3 to 5 years. In general there is no mention of the fact that in the U.S.A as well — especially in densely populated areas — additional legislation to protect tenants not only makes it increasingly difficult to raise rents, but also restricts the freedom of sale. This move into a changed investment environment has already — at least in part — been completed in Europe. In addition, the investor is faced with the question of whether he is willing to accept the traditionally higher tenant turnover, which not only involves

From 1977 to 1980, German investments in U.S. real estate almost quadrupled.

costly administration and greater wear and tear, entailing correspondingly higher maintenance cost, but also — in comparison with the Federal Republic — leads to a much greater leasing risk.

Investments in the housing sector, however, are often not based entirely on economic considerations; motives are often more of a private nature. Having one's own apartment in Florida or in sunny California has come a long way from being purely a matter of prestige; many investors consider this a kind of "refuge" for good — or bad — future times.

The same applies to investments in farmland. Regular income is relatively low. The appreciable demand sometimes observed can only be explained by the wish to own "one's own soil," since price rises only have an effect in the long run and the risk of being misguided in making an investment is particularly great, given the general lack of expert knowledge. In addition, the foreign investor is held to observe existing restrictions and should be aware that the future may bring even greater limitations whose repercussions cannot be assessed at present.

Defining the risk

Quite different situations are to be found in commercial real estate investments where prices, yields, chances and risks are of prime importance. Institutional investors — such as insurance companies, pension funds, real estate investment funds, etc. — in particular are guided exclusively by long-term return criteria. The private investor, thinking of diversifying his portfolio has, however, also become increasingly risk, price and yield conscious. Since he generally does not have the detailed knowledge of the numerous peculiarities of the individual real estate market and since the costs for the services of real estate agents, lawyers, tax consultants and accountants who are familiar with the subject and the local conditions often are high in relation to the sum available for investment, real estate investment funds are gaining more and more popularity. Investing in a "closed-end" real estate investment fund, however, does not mean that the investor can leap into the adventure of US real estate "blindfolded." As a rule, the German "closed-end" fund invests in a particular or a narrowly defined number of properties so that the investment's success or failure is closely linked to such properties. The investor will therefore be well advised to take a close look at the funds offered and especially the partners involved so as to separate the "wheat from the chaff." If the investment should prove to be as successful as the investor expects, care must prevail.

"To make sure that the investor's hope for future profits is realized, rent contracts need to be structured in a manner to allow passing on rising operating expenses completely to tenants."

"Institutional investors in particular are guided exclusively by long-term return criteria."

Risks can be hidden, especially in the lease contracts, to name only one of the most important considerations. Long-term leases which provide for automatic consumer price index escalation — frequently to be found in Europe in commercial leases for office space — are still not particularly widespread in the United States. Especially in older leases, it is often impossible even to pass higher operating expenses to the tenants. As a rule, rental rates in the U.S.A. include all operating expenses and are therefore within the responsibilities of the lessors. Especially costs for utilities, cleaning and — in comparison to the Federal Republic of Germany — very high real estate taxes can amount to as much as 40% and more of the rental rates. To make sure that the investor's hope for future profits are realized, rent contracts need to be structured in a manner to allow passing on rising operating expenses completely to tenants. A "gap" would greatly reduce the pleasure of owning real estate, especially in times of high inflation rates such as prevailed in 1980 (13.5 %).

Special attention must also be paid to the consideration that investments be made only in properties which on the basis of location and quality, provide — over the long run — optimal leasing prospects. The investor is well advised to be guided by the old real estate rule that he pay attention to three major considerations in investing in real estate. These are: Location, Location and Location, and that rent contracts should have different termination dates, enabling the investor to benefit regularly from increases in rent levels.

Generally the best prospects are offered by projects in growth regions where the rental rates have not yet been fully exploited and demand for prime office space exceeds supply. Obviously, good location and the quality of the property have their price — not least influenced by an increasing demand

by local and foreign investors; the "premium" over comparatively lower quality real estate, however, must be seen as the price for future safety and yield prospects. Initial yields, however, suffer under such circumstances. Recent examples show that even yields of 4% and less represent an acceptable basis, even for institutional investors, provided that there is an attractive upside potential. Just a few years ago cash yields between 8% and 10% for first class properties with "normal" mortgage financing (50% to 70% of the purchase price) were obtainable. Despite the inflation rate, the low yields of today are justifiable only if a property — for example because of its special location combined with leases being in place at well below market rates — offers above average potential within a foreseeable period. Such properties, however, are hardly to be found. This is the reason why some investors have in the recent past decided to enter the more risky development business and to "get in on the ground floor" in order to obtain more attractive returns. In such cases an experienced American partner is regularly selected who is granted an ownership interest of up to 50% (a US market practice little known in Europe) which also serves the purpose of evenly dividing the construction and leasing risks.

Differences between American and European shopping centers are not so significant. Percentage rents linked to sales are also common in the U.S.A. As in the Federal Republic, management plays an important role for the success or failure of an investment in a shopping center. It determines the product mix by the selection of tenants and an optimal combination of long-term and short-term lease contracts, thereby providing the necessary flexibility to respond quickly to changes in consumer habits. This also provides leeway to raise the basic rents of those tenants whose turnover was not yet sufficient to enable the lessor to charge percentage rent.

Shopping centers traditionally located in residential areas at the periphery of larger cities can quickly lose their attractiveness in a changing environment which may lead to reduced rental income, especially reduced percentage rent, increased vacancies or — at least — a decline of the quality of goods offered. Herein lies the greatest instability factor.

Less known — or less popular — are office/warehouses, because they are often burdened by long-term leases (not index-linked), so that, although they may offer a high degree of safety — given appropriate rents — there is little inflation protection.

This short excursion into some important aspects of the American real estate market shows that even in the United States — expressed in an old German saying — "the trees do not grow into the sky."

"Differences between American and European shopping centers are not so significant."

The U.S. as a hedge

The growing inclination for private property investments in the US therefore reflects more a move towards an increasingly internationally oriented diversification of funds. The United States of America does have many "strategic" advantages. Just now, there are incentives in the economic environment created by the recently announced tax cuts and the provisions for faster depreciation of real estate. The dependence on imported energy — so feared in Europe — is less important and indeed under favorable circumstances may virtually disappear.

The United States also has a huge domestic market which makes it largely self-sufficient. It is these structural features that are so positively assessed in making real asset investments — especially real estate investments — which became more and more popular after Germany's experience with two hyperinflations and the creeping inflation since the early Seventies. Hedging against inflation as a motive, however, requires a constantly rising income stream which real estate traditionally will provide only over a longer term. The initial yields in particular are often below the inflation rate. This is the main reason that all real estate investments should be long-term oriented — whether in Europe or in the United States. This must be the basis for any decision to invest in real estate, be it direct or via a closed-end real estate investment fund. This

"The growing inclination for private property investments in the U.S. therefore reflects more a move towards an increasingly internationally oriented diversification of funds."

"The prevailing exchange rate of the dollar or the short-term currency parity or interest rate outlook is of secondary importance for the investment decision."

is apparent when looking at institutional investors who very rarely sell real property once it is acquired. The prevailing exchange rate of the dollar or the short-term currency parity or interest rate outlook is of secondary importance for the investment decision. For investors who are seeking a "safe" investment haven, the United States offers the best climate.

Different customs, regional differences in such a huge market as the United States, language barriers, currency considerations, the common law which Continental Europeans are unaccustomed to, are all accepted, as is proven by the statistics. The growing tendency of private and institutional investors to place their funds in the United States reflects the overwhelming confidence in the ability of the American economy and politics to master current problems — inflation and unemployment, to name but two. It is particularly surprising that even record interest rates do not discourage potential investors even if they have to accept a "partner" who participates, sometimes quite substantially, in the cash flow during the term of the mortgage.

"Promised land" — yes or no? Certainly not in this absolute form. But almost all crucial criteria for long term investments — as real estate investments always are—speak for this "land of still almost unlimited possibilities," if prudence and care prevail.■

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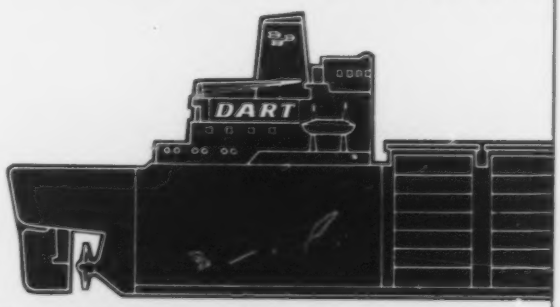

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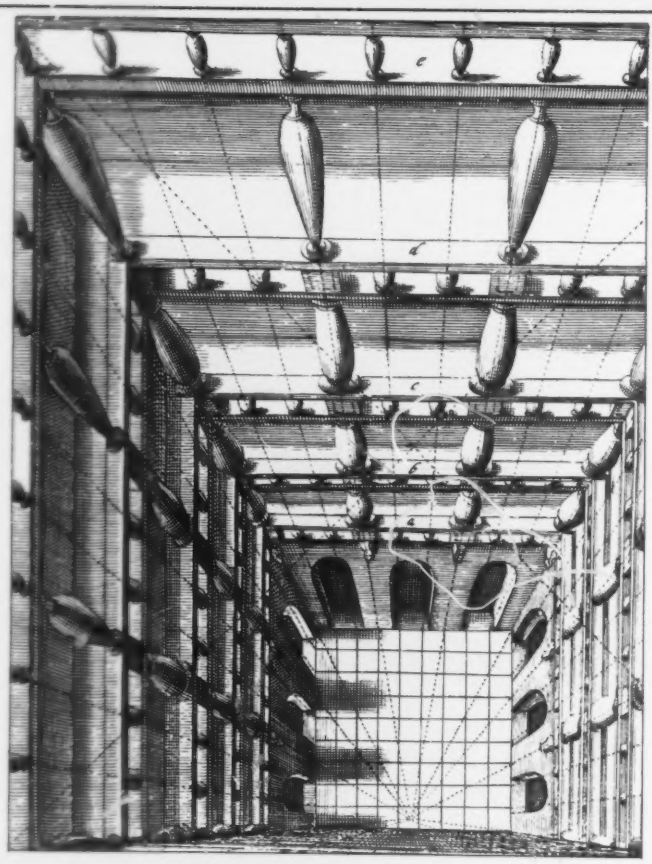
DEUTSCHE ZUSAMMENFASSUNG

Man spricht von der "Flucht" in den Dollar, ausgeloest durch die hohen Zinsen, aber auch durch eine wachsende Unzufriedenheit mit den wirtschaftlichen und politischen Verhaeltnissen in der europaeischen Heimat.

Wie "dramatisch" ist die Bewegung? In den Jahren 1977 bis 1980 flossen DM 45,6 Mrd. oder 14% der deutschen Neuanlagen im Ausland in die USA. Der private Grunderwerb spielte dabei mit nur DM 3 Mrd. eine vergleichsweise untergeordnete Rolle. Aufschlussreich ist jedoch der Zuwachs: Die Immobilienneuanlagen in den USA haben sich von 1977 bis 1980 fast verdreifacht. Die Frage, ob die Vereinigten Staaten wirklich das "gelobte Land" fuer Immobilieninvestitionen sind, ist damit aber noch nicht beantwortet. Dazu sind die Unterschiede zwischen den einzelnen Anlagemoeglichkeiten (vom Farmland bis zum Buerohochhaus) zu gross.

Im privaten Wohnungsbau fallen insbesondere Projekte auf, bei denen dem Anleger vergleichsweise hohe Gewinnaussichten geboten werden. Dabei wird unterstellt, dass die Wohnungen oder "town houses" nach einer drei- bis fuenfjaehrigen Startphase mit einem satten Aufpreis an die jeweiligen Mieter veraeussert werden koennen. Unerwaehnt bleibt in der Regel, dass auch in den Vereinigten Staaten— insbesondere in Ballungsgebieten— zunehmend Mieterschutzgesetze nicht nur die Mietanpassungen erschweren, sondern auch die Veraeusserungsmoeglichkeiten einschraenken. Fuer den Investor stellt sich



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ausserdem die Frage, ob er die Unsicherheiten aus der in den USA traditionell hoeheren Mieterfluktuation in Kauf nehmen will, die sich neben einer aufwendigen Verwaltung, staerkeren Abnutzung bei entsprechend hoeherem Instandhaltungsaufwand, aber auch in einem—im Vergleich zur Bundesrepublik—weitaus groesseren Vermietungsrisiko niederschlagen. Solche Investitionen sind jedoch in der Regel nicht nur wirtschaftlich begruendet; die Motivation liegt oft mehr im privaten Bereich. Eine eigene Wohnung in Florida oder im sonnigen Kalifornien beispielsweise ist weit ueber das reine "Prestigeobjekt" hinausgewachsen und fuer viele zu einer Art "Zuflucht" fuer gute und weniger gute Tage geworden.

Aehnliches gilt fuer Farmland. Die laufende Verzinsung ist vergleichsweise gering. Die zum Teil beachtliche Nachfrage laesst sich nur durch den Wunsch nach der eigenen "Scholle" erklaeren, da Preissteigerungen nur langfristig zu Buche schlagen und das Risiko einer Fehlinvestition bei meist mangelndem Fachwissen besonders gross ist. Der auslaendische Investor muss ausserdem bestehende Restriktionen beachten und sich darueber im klaren sein, dass die Zukunft noch weitere Erwerbs—oder Besitzeinschraenkungen bringen kann, deren Auswirkungen heute nicht abgeschaetzt werden koennen.

Ganz anders verhaelt es sich im gewerblichen Bereich. Hier spielen wirtschaftliche Faktoren—Preise, Renditen, Chancen und Risiken—die ausschlaggebende Rolle. Da der private Investor in der Regel nicht ueber ausreichend detaillierte Kenntnisse der vielfaeltigen Besonderheiten des jeweiligen Immobilienmarktes verfuegt und die Kosten fuer die Einschaltung von sachkundigen Fachleuten oft in keinem Verhaeltnis zu der verfuegbaren Anlagesumme stehen, erfreuen sich Immobilienfonds einer zunehmenden Beliebtheit. Die Beteiligung an einem "geschlossenen" Immobilienfonds heisst aber nicht, dass sich der Anleger "blind" in das Abenteuer US-Immobilien stuerzen kann. Der Anleger wird gut daran tun, die angebotenen Fonds und insbesondere den beteiligten Partner genau anzuschauen, um "die Spreu vom Weizen" zu trennen. Gefahrenmomente koennen vor allem in den Mietvertraegen verborgen sein, um nur einen wichtigen Punkt herauszugreifen. Die bei Buerogebaeuden in Europa haeufig anzutreffenden, langfristigen Mietvertraege mit Wertsicherungsklauseln, sind in den Vereinigten Staaten noch wenig verbreitet; auch eine vollstaendige Ueberwaelzung gestiegener Bewirtschaftungskosten auf die Mieter ist dort—gerade bei aelteren Objekten—haeufig nicht moeglich. In den USA sind sie in der Regel in der Miete mit eingeschlossen und liegen demnach in der Verantwortlichkeit des Vermieters. Insbesondere Energiekosten, Reinigung und die im Vergleich zu Deutschland sehr hohen Grundsteuern koennen 40% und mehr der Mieten ausmachen. Damit die Rechnung fuer den Anleger aufgeht, muessen die Mietvertraege volle Kostenueberwaelzung erlauben. Besonders zu beachten ist auch, dass

- nur in Objekte investiert werden sollte, die aufgrund ihrer Lage und Qualitaet, auch langrfistig die besten Vermietungsaussichten haben. Dabei laesst sich ein Investor am besten von dem alten englischen Grundsatz ueber die drei wichtigsten Investitionskriterien einer Immobilieninvestition leiten:

  1. Lage, 2. Lage, 3. Lage;
- die zeitliche Staffelung der Mietvertraege eine regelmaessige Anpassung an ein steigendes Mietniveau ermoeglichen sollte.

Generell duerften Vorhaben in Wachstumsregionen die besten Chancen aufweisen. Gute Lage und Qualitaet des Gebaeudes haben jedoch—nicht zuletzt wegen der steigenden in- und auslaendischen Nachfrage—ihren Preis; mit dem "Agio" gegenueber vergleichsweise weniger guten Objekten bezahlt der Anleger kuenftige Sicherheit und Renditeaussichten. Darunter leiden allerdings die Anfangsrenditen. Beispiele aus der juengsten Vergangenheit zeigen, dass selbst Renditen von 4% und weniger, bei entsprechendem Steigerungspotential, auch fuer institutionelle Anleger eine akzeptable Kaufbasis darstellen. Noch vor einigen Jahren sind bei erstklassigen Objekten mit "normaler" Fremdfinanzierung (50-70% des Kaufpreises) Barrenditen zwischen 8-10% erzielt worden. Die heutigen geringen Renditen sind trotz Inflation nur zu rechtfertigen, wenn ein Objekt z.B. wegen seiner besonderen Lage in Verbindung mit dem Umstand, dass die bestehenden Mietsaetze weit unter dem aktuellen Marktpreis liegen, ein ueberdurchschnittliches Potential in einem ueberschaubaren Zeitraum bietet. Solche Objekte sind jedoch kaum mehr am Markt. Deshalb haben sich speziell in juengster Zeit einige Anleger entschlossen, auch in das risikovollere Development-Geschaeft einzusteigen, um von "Anfang an" dabei zu sein und damit attraktivere Renditen zu erzielen. In der Regel verbinden sie sich eines erfahrenen amerikanischen Partners und ueberlassen diesem oft bis zu 50% Eigentumsanteile (eine in Europa wenig bekannte Usance des amerikanischen Immobilienmarktes), auch um die Risiken der Fertigstellung und der Vermietung zu teilen.

Bei Shopping Centers sind die Unterschiede zu den Usancen an den europaeischen Maerkten geringer. Auch in den USA kennt man die Umsatzkoppelung der Mieten. Aehnlich wie in der Bundesrepublik spielt das Management fuer den Erfolg einer Investition in ein Einkaufszentrum eine bedeutende Rolle. Es bestimmt den "Productmix" ueber die Mieterauswahl und versucht, eine optimale Mischung zwischen langfristigen und kurzfristigen Mietvertraegen zu finden. Dadurch wird die Flexibilitaet erreicht, die notwending ist, um veraenderten Kaufgewohnheiten der Konsumenten Rechnung tragen zu koennen. Auch koennen damit regelmaessig die Basismieten bei solchen Mietern angepasst werden, die noch nicht in die Umsatzmiete hineingewachsen sind. Shopping Centers, die in der Regel in Wohngebieten an der Peripherie liegen, koennen aber aufgrund veraenderter Umweltbedingungen rasch an Beliebtheit verlieren, was neben Einbussen bei den Ertraegen aus Umsatzmieten auch zu Leerstaenden—oder zumindest zu einer Verringerung der Qualitaet des Warenangebotes—fuehren kann. Hierin liegt fuer Shopping Centers der groesste Unsicherheitsfaktor.

Weniger bekannt bei auslaendischen Anlegern sind "office/warehouses", weil diese oft durch langfristige Mietvertraege (ohne Indexbindung) belastet sind und somit—bei entsprechenden Mieten—zwar ein hohes Mass an Sicherheit, aber kaum Inflationsschutz bieten.

Dieser kurze Ausflug in einige wichtige Segmente des amerikanischen Immobilienmarktes zeigt, dass auch dort die Baeume nicht in den Himmel wachsen.

Die zunehmende Neigung privater und institutioneller Anleger in den Vereinigten Staaten zu investieren, ist Ausdruck eines ueberdurchschnittlichen Vertrauens in die Faehigkeit der amerikanischen Wirtschaft und Politik, mit den gegenwaertigen Problemen—Inflation, Arbeitslosigkeit, nur um zwei zu nennen—fertig zu werden. Insbesondere ueberrascht, dass selbst durch Rekordhoehen bei Zinsen Anleger nicht abgeschreckt werden.

"Gelobtes Land"—Ja oder Nein? In dieser absoluten Form sicher nicht. Aber nimmt man die fuer eine langfristige Investition—und das sollten Immobilienanlagen immer sein—entscheidenden Kriterien zusammen, so spricht vieles fuer dieses Land "der noch immer schier unbegrenzten Moeglichkeiten," wenn man die entsprechende Vorsicht und Sorgfalt walten laesst.

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The Supply-Side Link in U.S. Economic Policy

by Lawrence A. Kudlow
Assistant Director for Economic Policy,
Office of Management and Budget

I am pleased to have the opportunity to discuss the linkage between monetary and fiscal policy within the context of the President's program for economic recovery.

Let me first emphasize the fiscal objective to discipline Federal expenditures, eliminate deficit finance and substantially curtail public sector credit absorption. In recent years, expanded Federal credit demand and numerous upward budget revisions have intensified inflation expectations, disrupted financial market activity, and frustrated the conduct of monetary policy. All this has contributed to record interest rates, double-digit inflation and weakened economic performance.

The relationship between budget announcements, inflation expectations and interest rates is well illustrated by events in late 1976 and early 1977. During 1976, interest rates on long-term government bonds declined to about 7¼%, aiding the recovery in investment and real output growth. Fiscal and monetary policies were moving along a non-inflationary path, and business confidence was reviving.

However, as year end information regarding the newly elected Administration's 1977 budget and deficit plans reached the market, long-term rates abruptly reversed direction. Inflation fears were suddenly re-ignited, and government bond yields retraced back to 7¾% in only a few months. Expansive budget policy caused a major financial turn for the worse. At the time, a 50-basis-point credit market adjustment was considered a substantial and unsettling change.

There are additional examples of the budget announcement effect. After a tightening of monetary policy in late 1979, inflation expectations had moderated slightly and long-term government bond rates declined. As a follow-up to monetary restraint, credit markets anxiously awaited the Carter Administration's new budget package, heralded in advance as a policy of restraint. Instead, the budget plan projected rapid outlay growth of 14.3% for 1981, with a deficit of $55 billion.

Negative expectations swept the financial

"The relationship between budget announcements, inflation expectations and interest rates is well illustrated by events in late 1976 and early 1977."

markets immediately. Government bond rates jumped to 10⅝% in January and escalated to 12½% by early March. As a result of new pessimism over the future value of financial assets, the price of gold passed through $800 per ounce and short-term interest rates exploded to around 20%.

Inflation expectations intensified during the early winter of 1980 because the budget announcement implied continued deficits, more rapid money growth, accelerating future inflation and escalating interest rates. Not until the major budget revisions of March and April 1980 was there any dampening of inflation fears and relaxation of tight credit market conditions. And this easing of financial markets was short-lived, as budget outlays and deficit estimates were again adjusted upward during the summer and autumn months, and interest rates spurted once more with the budget-induced revival of inflation expectations.

Damage and deficit finance

The breakdown of fiscal policy, and the related volatility of money and credit market behavior, also has acted as a significant deterrent to economic growth. From the fourth quarter of 1978 to the end of 1980 real growth increased at an average annual rate of only 0.7% while inflation accelerated to an average of about 9.0%. Substantial inflation premiums were built into long-term rates, along with new risk premiums to reward investors for the heightened uncertainty and frequent gyrations that became commonplace in the credit market. Investment horizons were shortened.

As another reminder of the damaging effects of deficit finance, during the first half of fiscal year 1981 financial markets were forced to absorb a record level of Treasury borrowing. Net new borrowing amounted to $63.5 billion during the October-March period, an increase of 69% from the average rate of first half new borrowing during the past 10 years.

But even this fails to capture the total credit absorption for public sector use. In addition to new Treasury borrowing from the public, the government has absorbed substantial additional amounts of private saving to finance government guaranteed loans and to finance various government sponsored enterprises. The loan guarantees include programs for housing stabilization and subsidies for agriculture, energy promotion, education and small business. Government sponsored enterprises include the Student Loan Marketing Association, Federal National Mortgage Association, Farm Credit Administration, Federal Home Loan Bank System, and the Federal Home Loan Mortgage Corporation.

When these credit demands are added to explicit Treasury borrowing and State and local borrowing, total new credit absorption by all levels of government and government sponsored enterprises comprised *42%* of all funds raised in U.S. credit markets in 1980. Office of Management and Budget (OMB) estimates suggest that this will rise to *46%* of

CREDIT ABSORPTION FOR FEDERAL AND FEDERALLY ASSISTED USES

(fiscal years; dollars in billions)

	Five-Year Averages					Current Estimates		
	1955-1959	1960-1964	1965-1969	1970-1974	1975-1979	1980 Actual	1981	1982
Total funds raised[1]	37.1	52.0	80.6	156.9	309.4	344.7	361.0[2]	403.0[2]
Federal borrowing	2.1	4.5	6.4	13.0	56.0	70.5	71.0[3]	60.0[3]
Guaranteed loans	4.7	4.4	5.2	14.4	14.8	32.4	48.0[3]	48.4[3]
Government-sponsored enterprise borrowing	.4	.7	1.0	5.0	12.9	21.4	18.2[4]	24.9[4]
Funds raised under Federal auspices	7.1	9.6	12.6	32.4	83.8	124.4	137.2	133.3
Federal absorption	19%	18%	16%	21%	27%	36%	38%	33%
Tax-exempt borrowing	5.0	5.5	7.9	14.3	20.4	23.6[2]	31.0[2]	34.0[2]
Deduction for double counting with guaranteed loans	.2	.5	.6	1.5	.7	4.1	3.3	3.2
Total raised for all Federal and federally assisted uses	11.9	14.6	19.9	45.2	103.5	143.8	164.9	164.1
Total absorption	32%	28%	25%	29%	33%	42%	46%	41%

[1] *Funds raised by non-financial sectors. Source: Federal Reserve Board Flow of Funds Accounts, except 1981 and 1982.*
[2] *OMB staff estimates derived from Treasury, CBO, DRI, and OMB data.*
[3] *Based on March budget revisions estimates.*
[4] *Based on January budget estimates.*

all U.S. credit market financing in 1981.

Between 1965-1969, average credit absorption for public uses amounted to only 25% of total funds raised in U.S. capital markets. The average for the early 1970's jumped to 33%, and the estimate for the average of 1980-82 is 43%. Credit absorption under Federal auspices alone was 16% of total capital market financing in the late 1960's, rising to 27% in the late 1970's and an estimated 38% in 1981.

The effect of this activity is to absorb valuable private sector saving and to place increasing upward pressure on interest rates. The total effect of the massive public sector credit absorption and the abnormally high interest rate levels substantially complicates and interferes with the conduct of monetary policy.

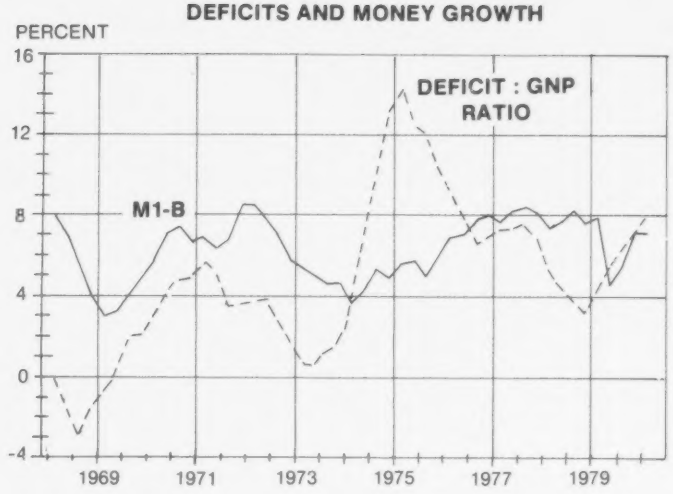
Fiscal and monetary linkage

In these circumstances the fiscal linkage with monetary policy becomes obvious. Although the relationship is not precise, evidence suggests a strong association between government deficits, borrowing and money growth. During the past decade this relationship was broken only briefly in 1975 and 1976, when several special factors converged to attract unexpected foreign demand for U.S. government securities. Other than those two years, the association between government deficits and money growth holds up well.

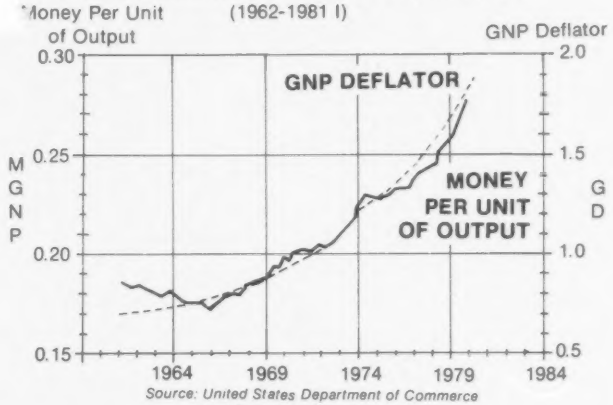
There is also a reasonably clear relationship between money growth and inflation. Sustained inflation is primarily a monetary phenomenon. Over time, continuous increases in the general price level can occur only when the rate of money growth exceeds the rate of growth of real goods and services. As the following graph suggests, the imbalance between real product and money, as measured by the rise in the ratio of money supply per unit of output, correlates closely with the increase of the price level.

The movement of interest rates is also heavily influenced by monetary changes or expected monetary changes. Market interest rates are comprised of three components. First, the natural or real rate, which varies little over time, and is influenced by changes in the productivity of capital. Second, the risk premium is a function of the creditworthiness of the security and, recently, the volatility of financial market behavior. Third, the inflation or price premium is a function of the expectation of future inflation and the future purchasing power of money. The inflation premium is by far the most volatile interest rate component. Lenders and borrowers are constantly adjusting the inflation premium

DEFICITS AND MONEY GROWTH



MONEY PER UNIT OF OUTPUT AND PRICES



Source: United States Department of Commerce and Federal Reserve Board

in response to changes in fiscal and monetary policy. As the following table indicates, there are clear associations between the movement of money growth, inflation and interest rates.

The fiscal-monetary linkage—moving from expanded public sector credit absorption to excessive money growth to

Money Growth, Inflation, and Interest Rates, 1956-1980

	1956-1964	1965-1974	1975-1980	1977-1980
MIB Growth (yearly % change)	1.94	5.55	6.62	7.40
GNP deflator (yearly % average)	1.99	4.80	7.52	7.66
90-day T bill rate (yearly average)	2.77	5.50	7.48	8.51
20 year average government bond rate	3.8	6.0	8.8	9.2

Source: United States Department of Commerce and Federal Reserve Board

rising inflation—has worked to undermine the economic saving-investment process in two important ways. First, as a hedge against inflation investors seek to protect their wealth by shifting portfolios out of productive financial assets such as stocks and bonds and into non-productive tangible assets such as gold, silver, and other commodities.

One-half Median Income			Median Income		Twice Median Income	
Year	Income	Marginal Rate	Income	Marginal Rate	Income	Marginal Rate
1965	$ 3,900	14%	$ 7,800	17%	$15,600	22%
1980	12,300	18%	24,600	24%	49,000	43%
Increase 1965-1980		29%	Increase 1965-1980	95%	Increase 1965-1980	41%

Note: Marginal Income Tax rates for four person families.

Second, the collision of the steeply progressive tax structure with accelerating inflation has substantially raised marginal tax rates and reduced after-tax rewards for work effort and saving. This tax brake effect has undermined investment and output growth during the 1970's, and is a direct result of the linkage between public sector credit demand, excessive money growth and accelerating inflation. Among the most visible economic consequences have been the decline in productivity rates and the rise in unemployment. These issues could be explored exhaustively, but in brief terms the data paint a bleak picture (see table).

AVERAGE GROWTH RATE

	Level of the NIA Federal Deficit (bill $)	GNP Deflator	Output Per Hour*	Unempl. Rate
1960-65	- 2.1	1.6	3.4	5.2
1966-70	- 5.0	4.2	1.9	3.9
1971-76	-29.7	6.4	2.1	6.4
1976-81	-42.6	9.5	0.7	6.8

*Private business sector.

From a budget standpoint, the effect of rising inflation and unemployment is substantial. Each percentage point increase in the average unemployment rate adds approximately $9 billion to outlays. A rough rule of thumb suggests that a 1 percentage point increase in the unemployment rate may reduce Federal receipts by as much as $12 billion and increase the deficit by roughly $20 billion. For inflation expectations, each percentage point increase in market interest rates adds roughly $3.5 billion in outlays for interest expense on the national debt. In addition, each percentage point gain in the consumer price index results in nearly $2 billion in cost-of-living adjustment related outlays.

In sum, the linkage between fiscal and monetary policy, and the economic effects of this linkage, is not an abstract matter. Another decade of accelerating Federal budget growth and massive government credit absorption virtually insures a continuation of the trend toward financial disorder, higher inflation, weaker productivity and rising unemployment. In turn, these trends insure a continuation of widening budget deficits and even greater Federal credit absorption.

With financial markets increasingly a government monopoly, U.S. business will be unable to replace obsolete plant and equipment, product lines will become outdated and unprofitable, and balance sheets will become dangerously illiquid. Venture capital will dry up and entrepreneurial innovation will falter. Our export position will deteriorate in a manner entirely consistent with the slump in investment, productivity and real output.

To prevent this, immediate steps must be taken to repair the existing financial market disorder and reopen long-term credit markets to the private sector. This cannot be achieved without a major reversal in government budget and credit policy—and this is precisely what the President's dramatic budget control plan is designed to accomplish.

When combined with the related elements of an incentive minded tax policy, regulatory rollbacks and monetary restraint, a cooperative interaction between fiscal and monetary policy can produce the desirable mix of financial market stability, lower inflation, and economic growth. The combination of sustainable growth and reduced inflation provides the surest and quickest path to a balanced budget, a restoration of fiscal credibility and a reliable value of money. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Autor, ein hochrangiger "insider", ein Kenner und Mitlenker der gegenwaertign Finanzpolitik in Washington, wiederholt die fiskalischen Zielsetzungen der jetzigen Administration: Eindaemmen der staatlichen Ausgabenflut, beenden der Haushaltsfinanzierung ueber staatliche Defizite und deutliches Verringern der oeffentlichen Kreditnachfrage. Gestiegener Kreditbedarf der Regierung und allzu viele Erhoehungen des Haushaltsvolumens haben die Inflationserwartungen ausufern lassen, die Rolle der Finanzmaerkte untergraben und alle Bemuehungen um eine solide Geldpolitik zunichte gemacht. Diese Entwicklung hat zu Rekordzinsen, zweistelliger Geldentwertung und einer Schwaechung der Wirtschaft gefuehrt.

Die Interdependenzen zwischen der Bekanntgabe von Zahlen zum Gesamtumfang des kommenden Staatshaushalts und der Zinsentwicklung, insbesondere fuer langfristige Anlagen und Ausleihungen, ziegt der Autor am Beispiel der Jahre 1976 und 1977 auf. Er analysiert die Beziehung zwischen dem Versagen der Fiskalpolitik und den daraus resultierenden Unsicherheiten auf den Geld-und Kreditmaerkten, sowie die damit zusammenhaengenden Stoerungen des wirtschaftlichen Wachstums. Dabei kommt der Autor zu dem Ergebnis, dass die enge Verbindung zwischen der Haushalts-, der Steuer- und der Geldpolitik, sowie die sich aus dieser Verbindung ergebenden wirtschaftlichen Effekte, keineswegs nur als abstrakter Vorgang zu sehen sind. Noch ein Jahrzehnt ueberproportional wachsender Staatshaushalte und oeffentlicher Kreditnachfrage, und es wird zweifellos zu weiteren Unberechenbarkeiten im geldlichen Bereich kommen, zu noch hoeherer Inflation, zu Rueckgang der Produktivitaet und wachsender Arbeitslosigkeit. Diese Entwicklungen werden dann ihrerseits wiederum eine Vergroesserung des staatlichen Defizits und noch groessere Kreditnachfrage der Regierung bewirken. Wenn aber die Kreditmaerkte zunehmend nur die staatliche Nachfrage bedienen, wird die US-Wirtschaft nicht mehr in der Lage sein, veraltete Industrieanlagen zu ersetzen oder neue zu errichten; Produktlinien werden unmodern und kostspielig und die Bilanzen werden zunehmend gefaehrliche Illiquiditaet ausweisen. Der Unternehmungsgeist wird veroeden und unternehmerische Erfindungsgabe wird ohne Antwort bleiben. Schliesslich wird auch die aussenwirtschaftliche Position in dem Mass verlorengehen, in dem die Investitionen, die Produktivitaet und das Realprodukt sinken. Damit es soweit nicht kommt, muessen sofort Schritte unternommen werden, um den ungleichgewichtigen Geldmarkt wieder zu balancieren und die Langfrist—Kreditmaerkte der Privatwirtschaft wieder zugaenglich zu machen. Genau das soll aber der dramatische Haushaltseinschraenkungsplan des Praesidenten bewirken. Verbunden mit einer stimulierenden Steuerpolitik, einem Zurueckschneiden der Regierungseinwirkungen auf weite Bereiche der Industrie und mit Ausgabendisziplin, kann eine auf Zusammenarbeit aufgebaute, ausgewogene Fiskal—und Geldpolitik die so erwuenschte Mischung aus Stabilitaet in den Finanzmaerkten, aus sinkender Inflation und wirtschaftlichem Wachstum mit sich bringen. Die Verbindung von stabilem Wachstum und nachlassender Inflation stellt den sichersten und schnellsten Weg zu einem ausgewogenen Budget dar, zu einer Wiederherstellung der fiskalischen Glaubwuerdigkeit und eines verlaesslichen Geldwertes.

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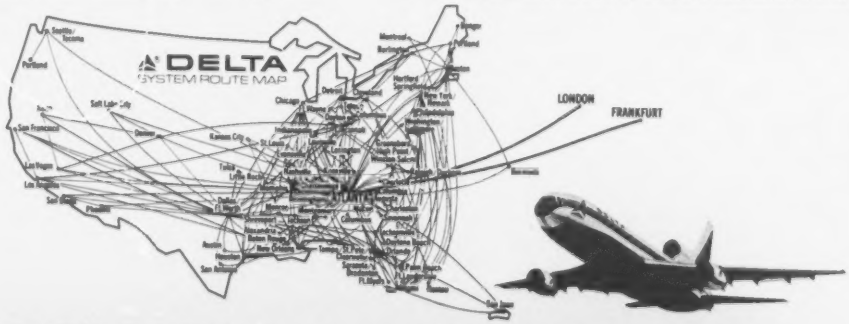

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U.S. Acquisitions: What's New in Matchmaking?

by Juergen Tschesnok/Godehard Puckler
Partners,
Peat, Marwick, Mitchell & Co.

With German direct investment in the United States of America expected to reach another record in 1981, the number of corporate marriages is soaring. Equally, the number of failures, near misses and unhappy surprises in the aftermath of an acquisition is mounting.

While German investors are known to be prudent businessmen who usually do not like to leave too much to chance, one cannot but wonder why the well-known German penchant for perfectionism does not yield anything but perfect matches.

Much has been said about deal-making techniques in the past, and German investors are usually complimentary when it comes to an assessment of the professionalism of their advisors who helped them in the process. However, in talking to both successful and unsuccessful investors some critical issues in the process of targeting, negotiating and integrating an acquisition seem to remain unresolved.

The need for well-defined strategies

Although much progress can be seen in the way German investors go about the identification and realization of acquisition opportunities, the majority of deals are still the result of the traditional portfolio approach in which the investor relies on reviewing for-sale offerings of his banker or broker who in turn will quote a healthy percentage fee for his services based on success. The process is easy to understand and usually has a good chance to result in the purchase of an investment opportunity. The shortcomings are equally evident. Since deals made depend largely on coincidence,

"...one cannot but wonder why the well-known German penchant for perfectionism does not yield anything but perfect matches."

"The best consultant for the German investor will be the individual who will most quickly discover the range of bargaining possibilities."

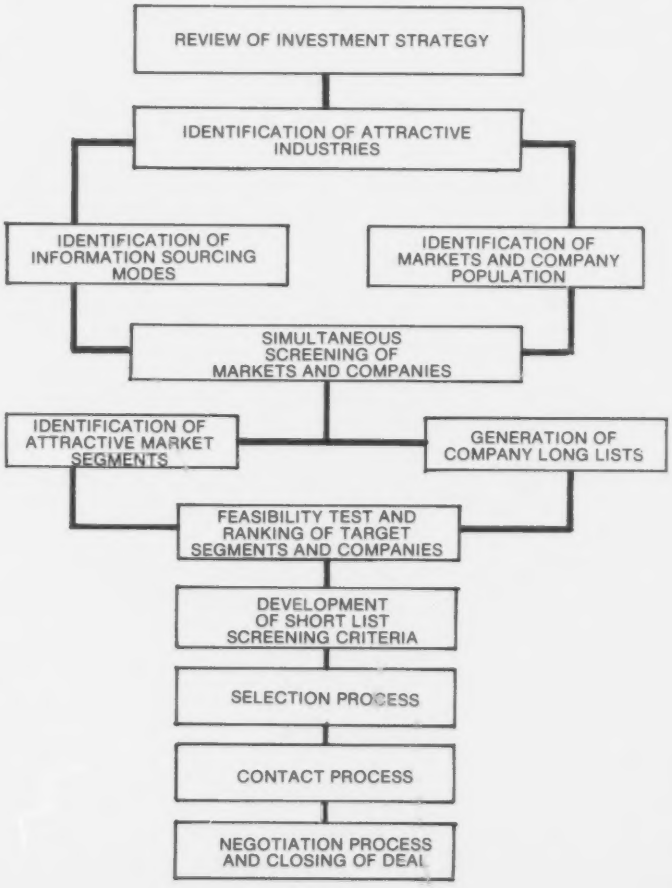
luck and the skills of a seasoned advisor, chances for a perfect match are unpredictable. More often than not the post-purchase integration and justification of an acquisition puts the investor's original strategy to a hard test.

Experience shows that the careful design of an acquisition strategy helps greatly to avoid costly mistakes which so often accompany ill-defined and spur-of-the-moment investment decisions. This is not to say that executive intuition should be banned from the process but rather that it should be applied at the earliest possible stage to capture the benefits of creatively anticipating as many implications as possible before the decision pressure, typical of the negotiating stage, can have its blinding effects.

Recently, more sophisticated and active rather than passive approaches have been probed by German corporate planners and consultants alike to identify and realize investment opportunities in the US with more accuracy, carefully matched with corporate diversification objectives. What at first glance may sound like yet another strain of German perfectionism makes a lot of sense when viewed under mounting risk and cost aspects.

These developments seem to center primarily on several aspects.

SYSTEM FLOW IN THE TARGETING PROCESS


REVIEW OF INVESTMENT STRATEGY
IDENTIFICATION OF ATTRACTIVE INDUSTRIES
IDENTIFICATION OF INFORMATION SOURCING MODES
IDENTIFICATION OF MARKETS AND COMPANY POPULATION
SIMULTANEOUS SCREENING OF MARKETS AND COMPANIES
IDENTIFICATION OF ATTRACTIVE MARKET SEGMENTS
GENERATION OF COMPANY LONG LISTS
FEASIBILITY TEST AND RANKING OF TARGET SEGMENTS AND COMPANIES
DEVELOPMENT OF SHORT LIST SCREENING CRITERIA
SELECTION PROCESS
CONTACT PROCESS
NEGOTIATION PROCESS AND CLOSING OF DEAL

Improved targeting methods

While investment bankers and lawyers have been considered traditionally as principal advisors on the Anglo-Saxon merger & acquisition scene, this role has been associated more closely with the public accountant in Germany. Therefore it may not come as a surprise when specialized service groups of the international accounting firms increasingly appeal to German investors. Especially those with a vast network of office locations and interdisciplinary consulting resources have recently shown a high degree of versatility in meeting investor needs.

Typical examples which may illustrate the breadth of skills currently available include sophisticated market research techniques for segmenting and screening markets in the US, utilizing advanced strategic planning concepts. Unlike the more traditional approaches commonly used, these concepts follow a logic which initially calls for the identification of attractive markets and then establishes success criteria to be used in the screening process for acquisition candidates. The use of special selection software makes extensive computer sourcing of commercial data banks feasible and guarantees a high degree of market penetration.

It is not unusual to screen 10 to 15,000 companies in a matter of days, only to concentrate on those targets which are expected to provide the best synergy effects, given the investor's individual situation. Contacting and probing a target's interest in merger negotiations are facilitated through a dense network of branches. Some of the leading firms can draw on more than 100 offices throughout the US and Canada which may be able to provide local assistance in critical phases of the project. Once a positive contact has been established and the interest to enter into negotiations has been secured, a so-called businessman's review or diagnostic review of the target company

"What at first glance may sound like yet another strain of German perfectionism makes a lot of sense when viewed under mounting risk and cost aspects."

helps to establish the negotiating platform by expert scrutiny of bargaining arguments.

In most cases activities in the US are directed and closely monitored by local professionals in Germany to avoid "translation" gaps and "culture shocks."

More effective management

When it comes to organizing his negotiating strategy the German investor is frequently faced with a predicament. On the one hand he sees a multitude of sources for professional advice available in the US; on the other hand he feels hard put to coordinate lawyers, investment bankers, accountants and specialized consultants without having proper back-up support in Germany from his traditional sources of advice. This is not only troublesome for the medium-sized entrepreneur who usually cannot call on experienced in-house staff for this purpose but frequently also for large corporations. Therefore, he may have to spend an excessive amount of time consulting with numerous professionals. More often than not, valuable time and negotiating advantages are lost in the process.

Clearly, there is the need for better coordinating assistance of inter-professional support between the two countries. In Germany it is common practice that the public accountant or "Wirtschaftspruefer" is called upon by the investor to assume this role. In fact, it would be very unusual if an interested buyer would approach a potential seller without being accompanied by his Wirtschaftspruefer. To the German investor these professionals are considered to be somewhat like a "private doctor" of the enterprise who can provide thorough knowledge of the over-all business situations of both the buyer and the seller and are usually trusted to have the desired ability of coordinating the combined efforts of lawyers, investment bankers and specialized consultants for the benefit of the buyer or seller alike.

The German investor understands that accountants are very well trained to develop solutions. He expects that his accountant understands Generally Accepted Accounting Principles in the USA and Germany and can make the necessary support logistics for operating in the United States available. What's more, the German investor will most likely tend to select the accountant who is skilled enough to bring these abilities to bear at the bargaining table.

At the bargaining table

Usually, the German investor wants the "Wirtschaftspruefer" to present a list of specific priorities and high but realistic targets favorably at the bargaining table. Obviously, his position can be strengthened if the accountant furnishes good and reliable information about the seller and his company during the meeting and acts not only as the observer of events but takes an active and creative part in devising and carrying through negotiating strategies.

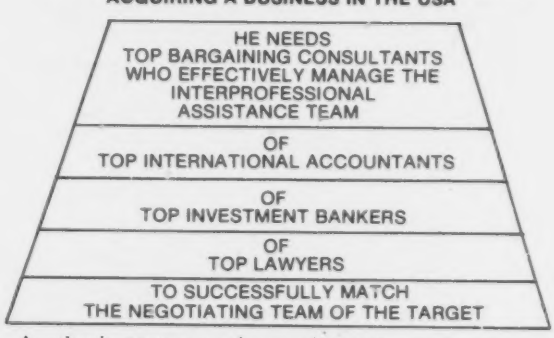
Very often the accountant needs to realize that the two parties, i.e., the purchaser (investor) and the seller (American company) strive to change the status quo by applying seemingly different methods. Identifying the causes of conflicts, therefore, must be considered the first important step in successful negotiation support.

The accountant must fully understand who is sitting at the bargaining table (Chart II) and the German investor would expect his accountant to be on top of all negotiations and effectively orchestrate all the professional talents sitting around the table (Chart III).

AT THE BARGAINING TABLE

IF EACH SIDE FINDS SOMETHING OF MUTUAL BENEFIT - BOTH CAN TRADE AND WIN

HIERARCHY OF NEEDS OF A GERMAN INVESTOR FOR ACQUIRING A BUSINESS IN THE USA



Another important requirement is that the German investor's accountant knows the seller's position as well. He has to be aware for instance that the seller's representative needs time to present his position to his side. There is a need to have a full understanding of the seller representative's difficulties in constantly monitoring his parties for changing preferences. Also, as a top negotiator the investor's accountant needs to make sure that the seller's representative always has a chance to look positive in his team's view.

"Whether the accountant of the German investor is right or wrong, he always has to be aware that there are many ways and possibilities within acceptable limits."

The best consultant for the German investor will be the individual who will most quickly discover the range of bargaining possibilities. He must be able to distinguish irrelevant comments from those statements which lead to earnest bargaining efforts and use the best and most pertinent information available to remove obstacles and focus on surmountable issues.

Although the accountant of the German investor should be aware that bluffs, deceits, etc. are frequently part of the bargaining process, he should not use these techniques in order to win. The most effective way to convince the other party that these tactics are not successful is to provide prompt and credible information. He should try to detect misrepresentations as early as possible. He should be able to establish and maintain an atmosphere of trust and ethical conduct throughout proceedings. He should display critical but fair judgement. Ambiguous statements should be avoided. However, it is both parties' prerogative to arrange and present the facts in the most advantageous order. It is helpful to use salient positions and special communication channels.

Whether the accountant of the German investor is right or wrong, he always has to be aware that there are many ways and possibilities within acceptable limits. He must decide what kind of approach to take, what kind of impression he wants to make, particularly under the assumption that German investors normally consider long-term perspectives rather than short-term gains. As a fair negotiator the accountant will be expected to adhere to rules that facilitate good bargaining by providing limits, reducing uncertainty and promoting reliable expectations. In response, the seller may be apt to bargain in good faith, justify his position and make reasonable concessions. The accountant has to keep in mind that beyond a particular bargaining session, the buyer will most likely continue to work with the seller who is his bargaining opponent at the moment. The seller's continued trust and respect will help the German investor and his accountant in the US and will facilitate future negotiations and activities.

Then, at the end, one has to promote the stability of the agreement and sell the contract to both business partners and other interested parties. It is conducive to all parties to establish an atmosphere of trust and goodwill on both sides so that no one will plan to plot revenge later.

The best individual to take on this challenge is the one who will have the personality and logistics to direct a concerted negotiating effort of high caliber professionals to speak one language, follow one objective and score as a team for the benefit of the investor. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Kauf von US-Unternehmen durch deutsche Investoren geht 1981 mit unverminderter Heftigkeit weiter. Dabei gibt es zahlreiche Faelle, wo es nicht zum Kauf kommt, wo es beinahe zum Kauf gekommen waere oder auch solche Faelle, wo unliebsame Ueberraschung nach dem Kauf des US-Unternehmens auftauchen. Da die deutschen Investoren vorsichtige Kaufleute sind, die wenig dem Zufall ueberlassen, kann man sich eigentlich nur wundern, warum es nicht ausschliesslich zu perfekten Uebernahmen kommt.

Viel ist in der Vergangenheit ueber die Techniken im Zusammenhang mit einem Unternehmenskauf in den USA gesagt worden, und grundsaetzlich sind die deutschen Investoren auch mit der bisherigen Beratung zufrieden gewesen. Trotzdem haben Ruecksprachen mit erfolgreichen und weniger erfolgreichen deutschen Investoren ergeben, dass im Bereich der Zielgerichtetheit des Vorgehens, im Verhandlungsgeschick mit den Amerikanern und in der Integration der vielfaeltigen Informationen und der vielen Berater (-staebe), kritische Fragestellungen offengeblieben sind. Gerade dort setzen die nebenstehenden Autoren an, indem sie exemplarisch folgende Aspekte neu beleuchten:

1. *Den Bedarf nach zielgerichteten Strategien;*
2. *Das verbesserte systematische Aufspue'en von Uebernahmekandidaten;*
3. *Effektiveres Management der interdisziplinaren Beraterassistenz;*
4. *Geschicktere Unterstuetzung am Verhandlungstisch.*

Bei der Beleuchtung der Aspekte 1. und 2. wird klar, dass es nicht ungewoehnlich ist, bis zu 15000 Moeglichkeiten mit Hilfe des Computers durchzuspielen, bevor man mit Hilfe der Logistik in USA und Kanada, vor Ort gezielter ans Werk geht. Dabei ist von besonderer Bedeutung, dass im uebertragenen Sinne das "Zielen" und das "Abschiessen" von Kandidaten mittels Fernsteuerung von Deutschland in enger Abstimmung zwischen Berater und deutschem Investor zu erfolgen hat.

Bei der Beleuchtung der Aspekte 3. und 4. wird klar, dass die Beratung aus einer Hand am zweckmaessigsten ist. Dies setzt wiederum voraus, dass der ausgewaehlte Berater des deutschen Investors—traditionell ein deutscher Wirtschaftspruefer—in der Lage sein muss, die Vielzahl der Spezialberater (Anwaelte und Investment Banker beider Seiten (Kaeufer und Verkaeufer), Berater bzw. Beraterstaebe und Angestellte mit Sonderaufgaben des Kaeufers und des Verkaeufers u.a.), effektiv zu managen.

Je besser dieser interdisziplinaere Einsatz zum Nutzen des deutschen Investors koordiniert wird und je geschickter die Verhandlungsfuehrung im einzelnen ist, desto erfolgreicher kann der deutsche Investor bei seinen Direktinvestitionen in den USA sein.

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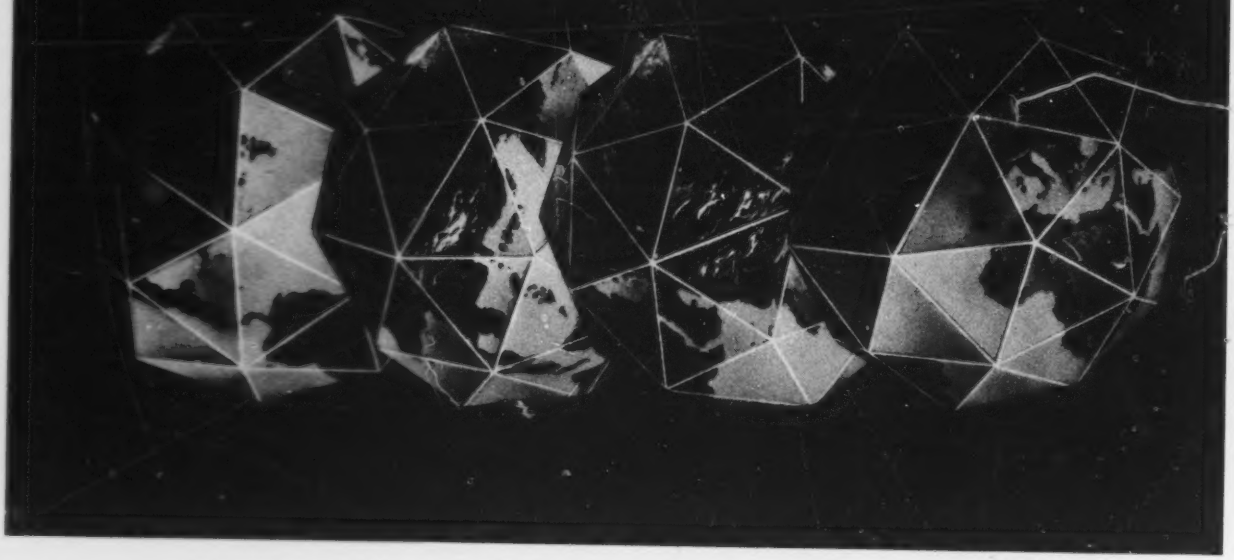

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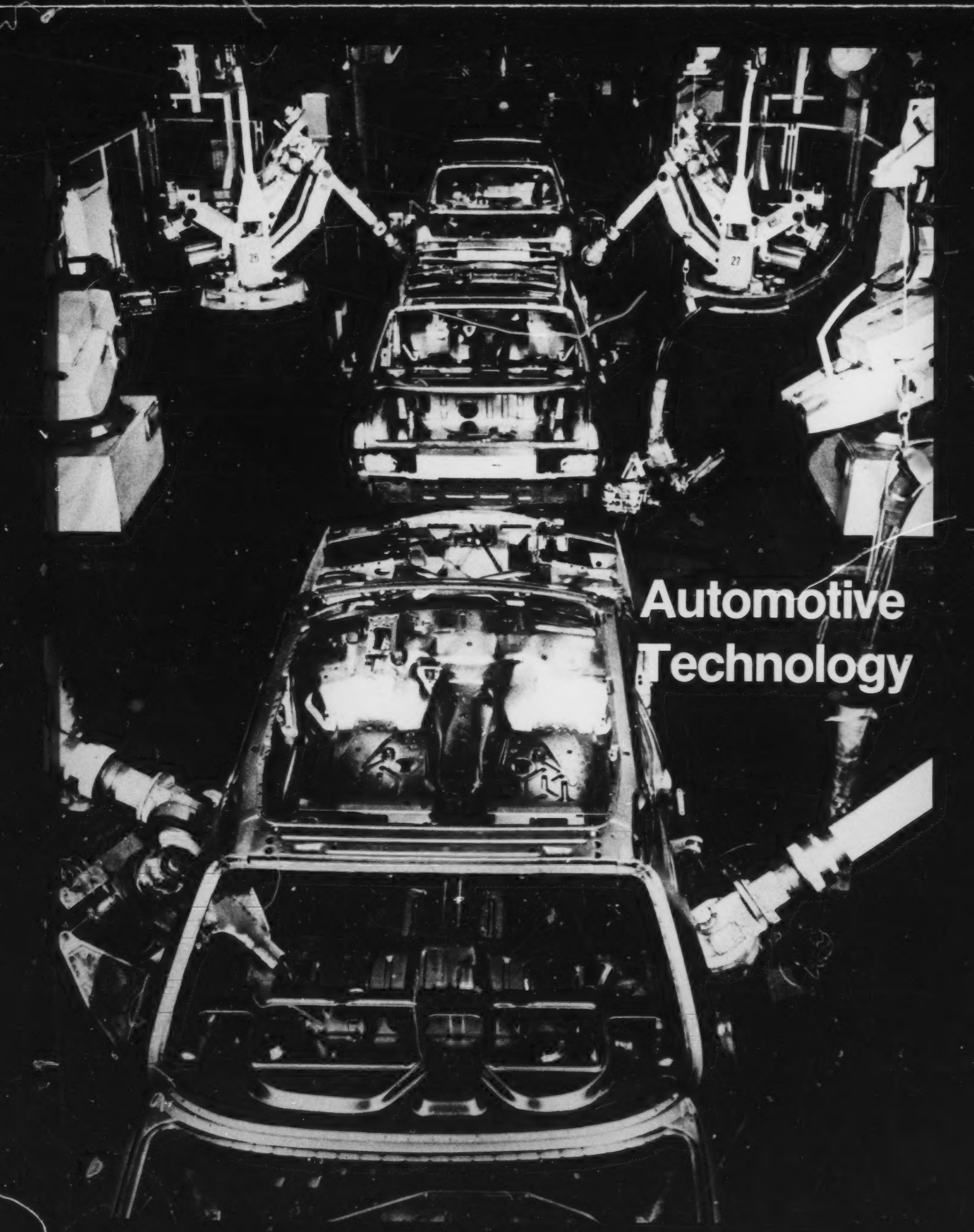


Automotive Technology

The Diesel and Changing Demands on Cars

by Dipl. Ing. Friedrich van Winsen
Director,
Daimler-Benz AG

As a source of power for cars the diesel engine now boasts a 45-year history. In 1936 the first diesel-powered automobile made its debut. It was the Mercedes 260 D with an engine featuring 2.6 liter displacement and delivering 45 HP. Until then the diesel engine was considered only as a suitable power plant for trucks, locomotives and ships. Big in noise, low in power and high in weight—the diesel hardly had a chance as a car engine.

The installation of diesel engines in cars only became possible with the development of the pre-chamber by Daimler-Benz. In the pre-chamber diesel the fuel is injected into a chamber adjacent to the cylinder head and partially ignited there. The "charge" thus being created is then forced under great pressure and high temperatures through the throat to the main combustion chamber, mixed there intensively with compressed air and burned completely. Thus, it is a two-stage combustion process.

"The installation of diesel engines in cars only became possible with the development of the pre-chamber by Daimler-Benz."

Compared to the older system in which the fuel is directly injected into the cylinder, the pre-chamber design's primary advantage is its relative quietness due to the muted ignition process.

The pre-chamber engine also puts less thermal and mechanical strain on its parts and can therefore be built lighter. It can rotate faster and therefore provides for a higher specific utilization of its power. It was mainly these characteristics that served to make the diesel engine suitable for cars. Daimler-Benz has retained and continues to develop the pre-chamber system for its automobiles to this day.

Background and beginnings

With the restart of production lines at the end of the war, Daimler-Benz recalled the encouraging success of the Mercedes 260 D and built its successor, the Mercedes 170 D, a vehicle with a displacement of 1.7 liters and 38 HP. It boasted legendary high fuel economy. With this model began the successful series of diesel-powered Mercedes automobiles. Their share in the volume of cars produced increased steadily in recent years and today amounts to about 50 percent. This raises the immediate question of why car buyers have helped the diesel

engine to such eminence among all the cars produced.

At first glance the diesel engine has the disadvantage of being higher in price, offering less power and making more noise than a gas engine of equal displacement. However, it has the following advantages:

- In certain markets diesel fuel is significantly cheaper.
- The fuel consumption of the vehicle, particularly in city traffic, is markedly lower.
- The ruggedly-built diesel engine with its simple injection system offers superior trouble-free service and durability.
- In the critical area between a cold start and reaching operating temperatures, the diesel engine does not suffer impaired driveability.

These advantages and the resulting market acceptance have also led other automobile producers to include diesel-powered cars in their production program. It should be added, however, that most of them adopted another cylinder configuration, namely the swirl chamber instead of the pre-chamber. The pre-chamber was not used by the companies new to diesels because they had no experience with the process, and because the Ricardo swirl chamber design had been fine-tuned and was available to licensees.

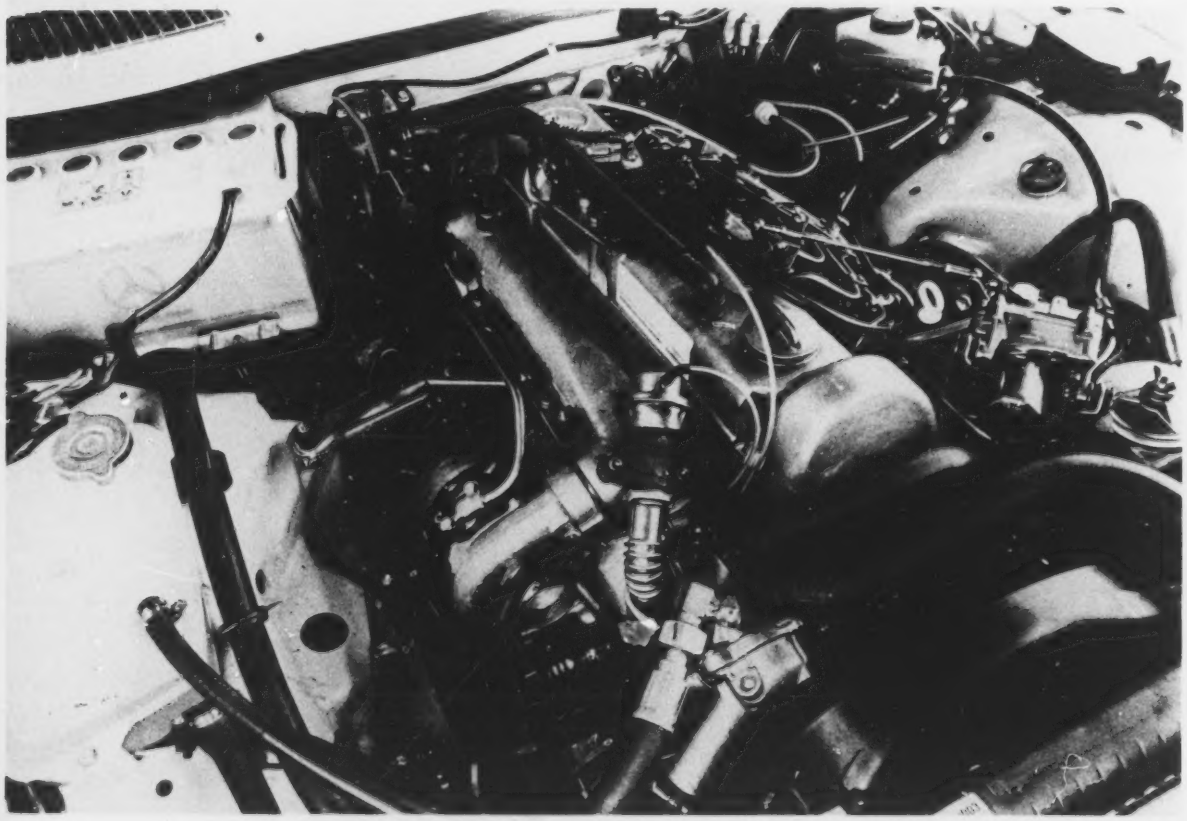
However, the choice of system—pre-chamber to swirl chamber—is immaterial to the following observations.

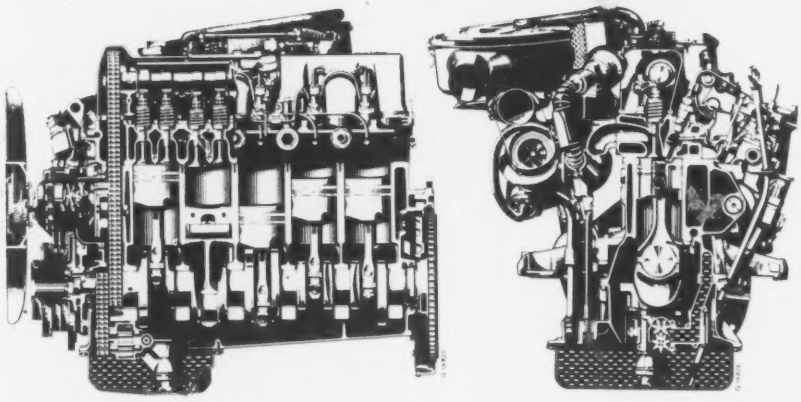
At first, American buyers tended to be unimpressed because the diesel offered less performance at a higher price, nor were fuel costs material.

While the diesel engine enjoyed growing acceptance in Europe following the war and a decided preference—reflected in a high share of diesel-powered cars—in countries with large price differentials between diesel fuel and gasoline, American buyers were less than enthusiastic about this"exotic" source of power. They tended to be unimpressed because the diesel offered less performance at a higher price. Moreover, fuel costs were not material in choosing between the diesel or gas alternative. That, however, was ten years ago.

America discovers the diesel

What has happened since has no parallel in the history of the American automobile market. In the meantime, the diesel-powered car has benefitted from an unforeseen acceptance, reflected not only in the growing appeal that the traditional European diesel manufacturers enjoy in the marketplace, but in the diesels that domestic producers





developed and introduced for their top-of-the-line cars. Indicative of the newly discovered value of diesel cars is the change in the Mercedes line: In the 1981 model year, the share of diesel-powered Mercedes automobiles produced for the American market grew to 70 percent.

Having languished at the fringe of the American market, automotive diesel technology moved to the forefront and became an industry yardstick. This dramatic change developed for three reasons: (1) U.S. law covering emission limits; (2) legal fuel consumption standards; and (3) the earlier gas shortages.

Following the passage of the Clean Air Act of 1963, the U.S. Environmental Protection Agency formulated increasingly stricter limits for pollutants in automotive emissions. To meet these standards for gasoline-powered cars, engines as well as the ancillary equipment had to be altered with the result that fuel consumption rose and thus fuel economy values dropped, power had to be reduced significantly, and the manufacturing costs, and hence prices, increased substantially. In other words, the trusty old gas buggy became more expensive to purchase, more thirsty for fuel, less powerful and more complicated, and thus more susceptible to repairs. As a result, the disadvantages until then attributed to the diesel in respect to its cost and power began to fade while its advantages—low fuel consumption—became steadily more apparent. All that was needed then in order to vault the diesel car to complete social respectability in the U.S. happened when the gas shortages occurred. Diesel drivers were spared its dire consequences.

"Having languished at the fringe of the American market, automotive diesel technology moved to the forefront and became an industry yardstick."

In contrast to gasoline engines, the diesel had not given up any of its original advantages because, inherently, its emissions of the three pollutant components CO, HC and NOX are very low; that means that the emission limits, currently applicable, were met without resorting to alterations that would either raise fuel consumption or prove to be unreasonable in cost.

Having diesel cars in his line of autos made it easier for the manufacturer to stay under the legally imposed fuel consumption limit. The Fuel Economy Standards require proof from each producer or importer that the average consumption of the units sold per year does not exceed a certain prescribed amount, or, expressed as Corporate Average Fuel Economy (CAFE) in mpg (miles per gallon), does not fall short of the prescribed amount. In the model year 1985, the final goal of 27.5 mpg, calculated on a uniform basis, is to be reached.

A 1981 mid-size gas-powered car (with a weight of about 3,500 lbs.) averages a consumption of 17-20 mpg, a small car weighing about 2,000 lbs. about 25 mpg. By contrast the corresponding values for diesel-powered cars offer a fuel economy of 26 and 40 mpg respectively.

To market a fleet capable of more than 27.5 mpg, a manufacturer must include in his line models with decidedly better than 27.5 mpg consumption in order to compensate for gasoline-powered mid-size models. Due to the cited fuel economy standards, it is necessary to sell many small cars in order to be able to sell some normal cars. Expressed more plainly: The chance of survival for the mid-size family car improves as soon as it becomes possible to make this type of vehicle conform to 27.5 mpg and thus neutralize it in respect to CAFE.

Diesel engines represent the only promising approach to this goal. Daimler-Benz adopted this path with the introduction of the 300 SD as part of its 1978 line of cars. The 300 SD belongs to the S class. It has a 3-liter diesel engine with turbocharger. Other

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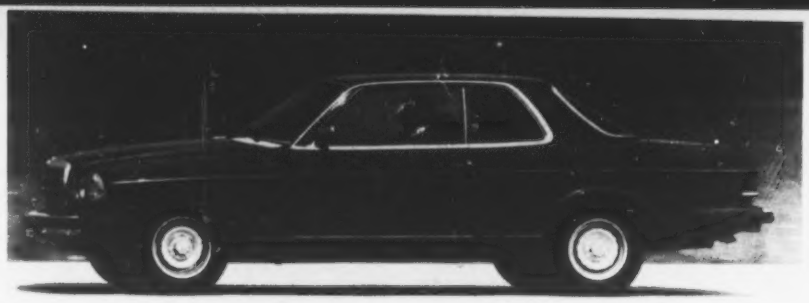
manufacturers, particularly those in the U.S., have chosen to develop existing V-8 engines with larger displacements into diesels without charger. Given the conditions prevailing today, a steadily expanding U.S. market for diesel-powered cars is foreseen. It augurs well for the growth of a new population of energy-saving, environmentally compatible cars.



Emission idiosyncracies

This expectation has prompted the Environmental Protection Agency to examine the characteristics of the diesel engine more closely. Until now all the emission regulations have focused mainly on gasoline-powered cars.

Of the three "classic" emission limits for CO, HC and NOX the diesel car meets the CO and HC standard without particular difficulties. It is inherent in the function of the diesel that the high surplus of air minimizes the pollutants in the combustion of the carbon and hydrogen parts in the fuel. This advantage, on the other hand, makes it difficult to counter the formation of NOX, because the surplus of air at high temperatures and high pressure favors the conditions for forming generous quantities of nitric oxide.

To circumvent this condition, by reducing the surplus of air that proves to be so advantageous otherwise, a mixture of fresh air and exhaust gas could be fed into the cylinder. It is called Exhaust Gas Recirculation=EGR. The application reduces the formation of NOX decidedly. Unfortunately, however, the presence of a so-called inert gas (exhaust gas) leads to a deterioration of the combustion quality which in turn leads to a sacrifice in power and consumption characteristics. Too much EGR also poses an additional problem with another diesel emission: the formation of soot is increased.

Soot forms in the diesel engine when the injected fuel does not have enough air for combustion available. If no soot is to be emitted, then, as more power (and injection) is developed, the space for recycled gas diminishes. As the load on the engine increases, the exhaust volume has to be decreased to zero. Thus, a special exhaust control mechanism to operate in keeping with the load on the engine is required in order to stay adequately away from the soot limit.

Understandably, the Environmental Protection Agency would like to limit the soot emissions (Particulate Matter=PM) of diesel engines. And that creates a growing dilemma today. It is the subject of current discussions between U.S. government bodies such as EPA and the automobile industry.

The NOX values are to be reduced; that can only be achieved with the recycling of the exhaust gas. High rates of such recycling increase the soot emissions (PM) and cause an increase in fuel consumption. In addition, when the engine operates under partial loads, a high rate of exhaust recycling will cause a loss of exhaust gas to power the turbocharger. That impairs the acceleration severely and the turbo diesel's decisive advantage of optimal fuel consumption is lost. But the PM values are also to be limited; that goes of course counter to the application of EGR.

The whole matter is further complicated by the inability of California's Environmental Protection Agency and the Federal EPA to agree on priorities. Apparently California champions NOX reduction and is formulating stricter limits than the EPA. It is to be feared that for

"It is evident that exaggerated demands concerning the NOX emission quality of the diesel engine will lead to a loss of its advantages, namely ruggedness, durability, simplicity, economy and reliability."

California and the remaining states diesel cars with different sets of specifications will have to be developed—one to emphasize NOX reduction, the other to give priority to PM reduction.

Research has demonstrated that the emission values for NOX and PM correlate linearly with the weight of the vehicle. The conflicting aims, to reduce NOX and PM emissions simultaneously, could thus be defused by turning to lighter, consequently smaller automobiles. This determination brings us back to the beginning of our deliberations. In considering gasoline consumption, we had followed the same line of implementation.

It is evident that exaggerated demands concerning the NOX emission quality of the diesel engine will lead to a loss of its advantages, namely ruggedness, durability, simplicity, economy and reliability. If the diesel engine can hold its place within legally prescribed premises only by being built into small cars and, additionally, by being equipped with complicated control mechanisms, then its existence on U.S. roads is threatened. As an alternative to the gasoline motor it would then have sacrificed most of its attractions for the buyer. The subject of even more serious concern is the outlook for marketing mid-size family cars capable of meeting the 1985 consumption requirements.

As a consequence of such a situation, it is to be feared that the automobile industry might not be able to meet the demand for such cars since the mechanism of the CAFE regulations would necessarily limit the number of gasoline-powered mid-size cars.

We must, therefore, accord recognition to the potential contribution which the diesel engine can make to the solution of the energy question. At the same time, we must also appreciate that if this engine is saddled with demands which threaten to overburden the basic mechanism, its outstanding advantages will then be threatened. At this time such considerations apply only to the U.S. market, where the fortunes of the diesel—its life or demise—in the mid-size car depend on evolving emission regulations.

On the other hand, in other markets of the world the advantages of the diesel car and its contribution to sparing our energy reserves are promoted through a sensible application of fiscal measures such as fuel or vehicle taxes. ■

DEUTSCHE ZUSAMMENFASSUNG

Das kuenftige Schicksal des Dieselmotors, der in den Vereinigten Staaten gerade erst als wirtschaftlicher Pkw-Antrieb entdeckt und vom Autofahrer angenommen wird, ist ungewiss. Es haengt von den Anforderungen ab, die von den Umweltschutzbehoerden an die Abgasqualitaet von Pkw-Motoren gestellt werden. So guenstig der Dieselmotor bei den Werten fuer Kohlenwasserstoff und Kohlenmonoxyd abschneidet, so schwierig ist es, den staendig schaerfer werdenden Standards zu Rauchentwicklung und Stickstoffoxyd gerecht zu werden. Mit dem Schicksal des Dieselantriebes fuer Pkws wird auch das Schicksal fuer das mittlere und das grosse amerikanische Personenauto entschieden, das aus Gruenden der Treibstoffkosten nur mit dem wirtschaftlichen Dieselantrieb als Massenverkehrsmittel in den USA weiterhin denkbar ist.

Die Geschichte des Dieselmotors als Pkw-Antrieb begann 1936 mit dem damaligen Mercedes 260 D, der von einer 2,6 l Dieselmaschine mit 45 PS angetrieben wurde. Bis dahin fand das Dieselprinzip nur Anwendung in Grossmotoren fuer Lastwagen, Lokomotiven und Schiffe. Viel Laerm, grosses Gewicht und wenig Kraft— der Diesel hatte kaum eine Chance als Automotor. Erst mit der Entwicklung der Vorbrennkammer bei Daimler-Benz wurde es moeglich, eine Dieselmaschine zu bauen, die nach Gewicht, Mechanik und Leistung fuer Pkws geeignet war. Heute wird jeder zweite Mercedes mit Dieselantrieb ausgestattet. Dieser Motor, der auch heute noch mehr kostet, bei gleichem Hubraum weniger leistet und deutlich mehr Geraeusche abgibt als der vergleichbare Ottomotor, hat dennoch eine Reihe von Vorteilen, die ihm die Zukunft auch in USA sichern sollten:

- *Der Kraftstoffverbrauch ist insbesondere im Stadtverkehr wesentlich niedriger als bei einer vergleichbaren Benzinmaschine.*
- *Die robuste Maschine mit ihrem einfachen System der Kraftstoffeinspritzung ist weniger reparaturanfaellig und haelt laenger als der vergleichbare Benzinantrieb.*
- *In der kritischen Phase zwischen Kaltstart und Erreichen der idealen Betriebstemperatur zeigt der Dieselmotor im Gegensatz zu anderen Maschinen keine Leistungabfaelle.*
- *Und schliesslich ist Dieselkraftstoff auf vielen Maerkten deutlich billiger als Benzin.*

Angesichts dieser Vorteile haben auch andere Pkw-Hersteller den Weg zum Dieselmotor gefunden, allerdings ueber das Prinzip der Ricardo-Wirbelbrennkammer und nicht ueber die Vorbrennkammer, nach

der Daimler-Benz noch heute seine Pkw-Diesels baut.

Gemeinsam sind beiden Systemen die Vor- und Nachteile des Dieselmotors. Mit dem Antritt des Siegeszuges des Pkw-Dieselmotors in Amerika ist es fuer alle Hersteller dringend geworden, mit den amerikanischen Vorschriften als Masstab, den Dieselantrieb so umweltfreundlich und so kraftstoffgenuegsam wie moeglich zu entwickeln. Es ist viel zu gewinnen—ein Antrieb, der es dem amerikanischen Verbraucher mit Durchschnittseinkommen auch weiterhin wirtschaftlich erlaubt, ein grosses, bequemes Familienauto zu fahren, und es ist viel zu verlieren—der riesige US-Automarkt, in dem es zur Zeit mehr als 80 Millionen Pkws gibt.

Ausfuehrlich geht der Verfasser auf die technische Problematik ein, die sich dem Ingenieur stellt, der es sich zur Aufgabe gemacht hat, den rundherum umweltfreundlichen Dieselmotor zu entwickeln. Rauch und Stickstoff lassen sich nur zu wesentlich erhoehten Kosten, bzw. bei Inkaufnahme erheblicher Leistungsverluste, noch weiter als bisher schon geschehen reduzieren.

Interessant ist es, dem Autor in die Corporate Average Fuel Economy (CAFE)—Regelungen zu folgen, nach denen in USA die Modellpalette (fleet) eines Herstellers im Durchschnitt eine sich jaehrlich erhoehende Anzahl von Meilen mit einer Gallone Kraftstoff fahren muss. Dies heisst, dass beispielsweise ein genuegsames Auto mit Dieselantrieb, das etwa 40 Meilen mit einer Gallone Treibstoff bei Durchschnittsgeschwindigkeit zuruecklegen kann, in der Gesamtfahrzeugpalette eines Herstellers unverzichtbar ist, der seine grossen Luxuslimousinen verkaufen will, die eventuell nur zwischen 9 und 12 Meilen mit einer Gallone Treibstoff rollen. Hier hat der Dieselmotor eine wichtige Funktion. Dank seiner Genuegsamkeit kann er die vorgegebenen Standards, fuer das laufende Jahr 20 Meilen/1 Gallone, wesentlich mueheloser erfuellen, als ein Benzinmotor mit vergleichbarer Leistung. Zur Erfuellung der behoerdlich vorgeschriebenen Durchschnittswerte ist ein Fahrzeughersteller praktisch auf die Einstellung von Dieselmodellen in seine Fahrzeugpalette angewiesen.

Werden der Dieseltechnik immer neue Anforderungen aufgebuerdet, die ihre Besonderheiten, naemlich Wirtschaftlichkeit und einfache Wartung, aufheben, so ist damit eine Antriebsart fuer das Auto gefaehrdet, die in hohem Masse zur Loesung der auch in den USA fuehlbaren Energieproblematik beitragen kann.

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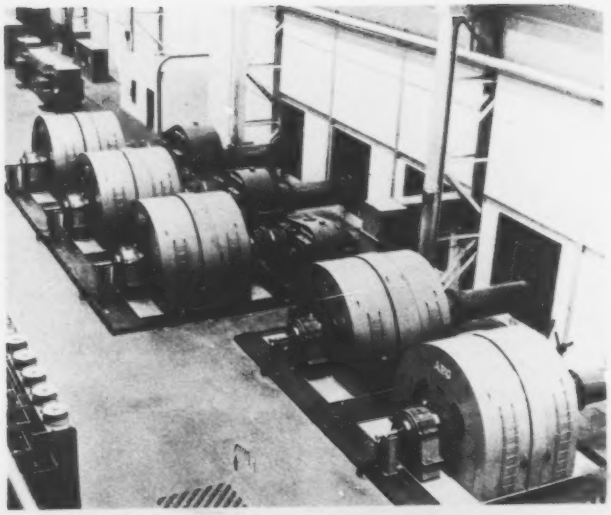

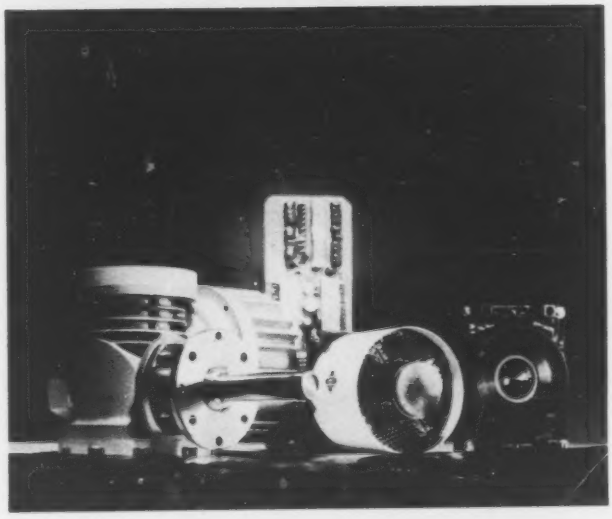

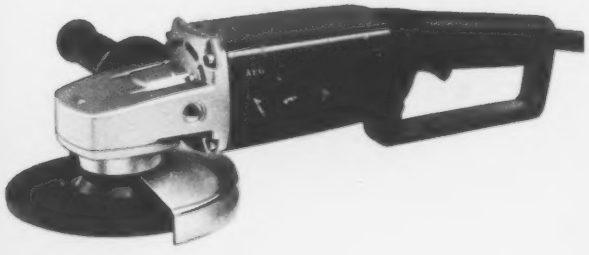

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The Emerging Role of the Diesel in the U.S.

by Harry Turton
Assistant Director
of Public Relations, New York
General Motors Corporation

When Rudolph Diesel first tried to start the engine that he had invented, the powdered coal that he used for fuel blew up. The engine was destroyed, but Diesel went on to develop a power plant that is used today in everything from ocean freighters to miniature electric generators.

Now another diesel explosion is taking place, but this time it is more of a boom than a bang. Lured by the engine's fuel economy, American automobile and light truck buyers are choosing diesels in explosive numbers.

Diesel passenger car sales hit a record 50,000 last August in the United States. During the first eight months of 1981 they were up almost 32 percent over the same period of 1980, while sales during the '80 calendar year were 38 percent above those of 1979. Now the forecast is for even faster growth.

Though purchases of conventional cars are lagging, domestic and imported diesels—despite their higher cost—are virtually certain to pass a half million sales this year, up 22 percent from some 387,000 sold during 1980, and may double during 1982 with new products coming on stream.

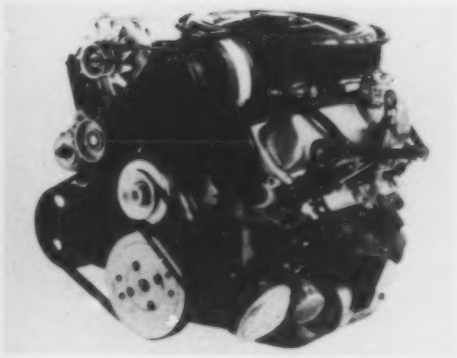
"Lured by the engine's fuel economy, American automobile and light truck buyers are choosing diesels in explosive numbers."

Diesels are capturing a growing share of the light-duty truck market as well. During the first seven months of 1981 sales totaled 50,863, up 38 percent from the 36,820 sold during the same period of 1980. The Japanese, acting on the trend, introduced four new diesel-powered mini-trucks early in '81.

The diesel genesis

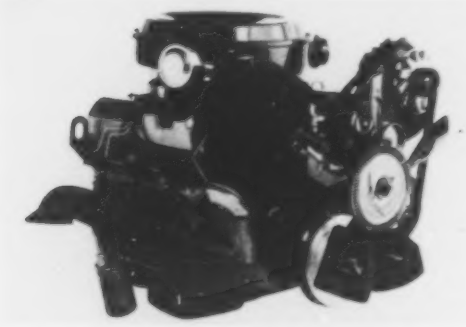
General Motors vehicles represented more than half of the U.S. diesel-powered autos sold last year. It anticipates that by 1985 diesels will be available in virtually all of its cars and most of its trucks and will constitute 15 percent of its annual sales, up close to 10 percentage points from the diesel portion of its '80 sales. It was GM's Oldsmobile Division that touched off the diesel explosion in this country. Historically the "lead division" in the development of powerplants for GM's five car divisions, Oldsmobile engineers set out in 1973 to create a diesel engine that could compete successfully with gasoline.

It was hoped that the diesel would protect



the full-size family car from ever-rising fuel prices that were threatening to drive it off the road. At the same time the engine would contribute substantially to the nation's fuel conservation program.

Diesel engines use the heat of air compression, rather than a spark plug, to fire the fuel that is fed to their cylinders by injectors rather than a carburetor. The engine's fuel economy comes from several sources. Its typical air-fuel mixture is 40-to-1 or higher; in a gasoline engine the normal mix is 15-to-1. Its compression ratio is about 22-to-1 compared with a gas engine at about 8-to-1. A gallon of diesel fuel packs about 10 percent more energy than a gallon of gasoline and a diesel does not suffer the power loss associated with the fuel throttling of a gasoline engine.



Using a 350 cubic-inch V-8 gasoline engine as a starting point, the Olds team produced a diesel whose acceleration—long a sore-point with engines of that type—topped any passenger car diesel then available. Other typical diesel drawbacks—noise, exhaust pollutants, smoke and odor, cold start sluggishness, ignition delay, oil and filter change frequency—were minimized.

Best of all, the new 5.7 liter, 105 h.p. engine could power Oldsmobile's full-size sedans and station wagons 25 percent farther on a gallon of fuel than their standard gasoline engines could. And diesel fuel costs a good deal less than gasoline. No other technology offered a comparable fuel-saving. To match the diesel's efficiency through weight reduction, for example, 900 lbs. would have had to be trimmed from a six-passenger, gasoline-engine car, bringing it down to the weight of a compact. The diesel's fuel economy potential was particularly important if GM was to continue to offer a full range of passenger cars and simultaneously meet the rising fuel economy expectations of two groups—car customers and Congress.

"Except for Volkswagen of America, General Motors is the only domestic producer of diesel-powered motor vehicles."

Oldsmobile introduced the diesel as an option on its 1978 full-size models. Initial production difficulties limited availability, and sales the first year just topped 31,000. By the next year, however, Olds had erased the manufacturing snags and invented a way to cut the diesel's cold weather start-up wait from 60 to six seconds. After making the engine available to GM's other car and truck divisions, sales more than quadrupled to some 127,000.

For Oldsmobile, which sells all of the diesel engines that it can produce, it's been onward and upward ever since. During 1980 the division's diesel production hit almost 279,000 and is expected to top 400,000 this year. The importance of the diesel's fuel-stretch to GM is found in the figures for 1980. That year the company produced some 4,000,000 passenger cars in the U.S. The mandated CAFE (Corporate Average Fuel Economy) for it and all other automakers was 20 miles per gallon, up one mile from 1979. General Motors estimates that the 211,132 diesel-powered cars that it manufactured last year contributed one-fourth of the total increase that it had to—and did—achieve.

The diesel's modest fuel appetite appeals not only to the owners of full-size vehicles. Last spring the Chevrolet division offered an optional 1.8 liter (109 ci), four-cylinder diesel on its subcompact Chevette with 55/40, highway-city mileage estimated. The 51 hp engine is manufactured by Isuzu Motors, a Japanese car-and-truck maker that is partially owned by GM. During the 1981 model year Chevrolet sold about 7,000 diesel-powered Chevettes; next year it expects to market 60,900.

Keeping the lead

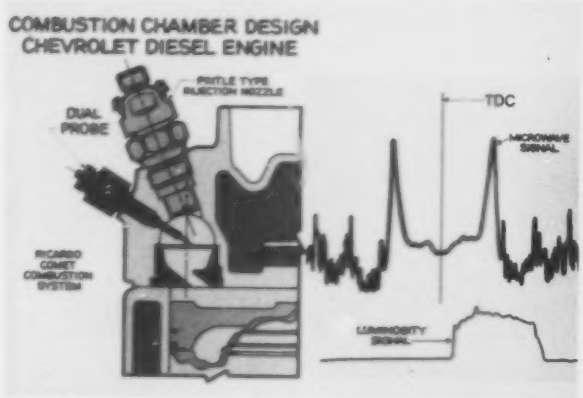
Except for Volkswagen of America, General Motors is the only domestic producer of diesel-powered motor vehicles. Its head-start development of the diesel enabled it to take better than 55 percent of that engine market in this country during the first seven months of 1981. It intends to preserve its out-front position with two new 1982 diesels—one for trucks and one for automobiles.

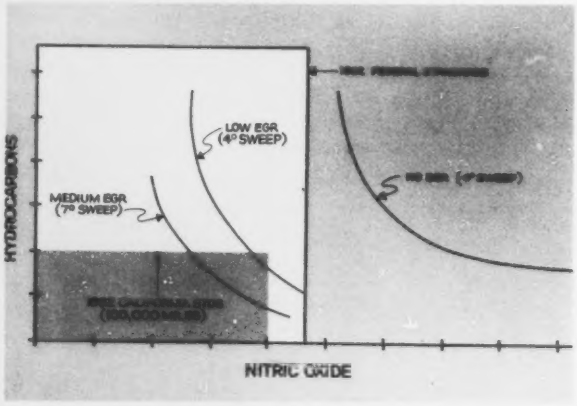
Chevrolet has brought out a 6.2 liter (378 ci), 130-horsepower V-8 diesel that is available nationwide on its light-duty trucks, suburbans and recreational vehicles. And Oldsmobile has introduced a new 4.3 liter (262 ci), V-6, 85 hp fuel super-saver that will

be available on brand new Olds, Buick, Pontiac and Chevrolet midsize cars. The new Oldsmobile and Chevrolet diesels will be manufactured in new facilities. Oldsmobile built a one-million-square-foot plant near its headquarters in Lansing, Mich., that will have a capacity of 1,600 engines a day. Chevrolet converted an existing plant in Moraine, Ohio. The division expects that 125,000 of the 500,000 light-duty trucks, suburbans and recreational vehicles that it plans to build this year will be diesel-powered.

The new engines represent a breakthrough in the control of diesel exhaust emissions. Using microwave sensors on the production line, Chevrolet and Oldsmobile can time fuel injection on both diesels so precisely that the engine's oxides of nitrogen emissions meet not only federal standards, but the more demanding levels in force in California as well.

"The prospect of more and more diesels on the road has sparked extensive discussion of the possible health effects of their exhaust emissions."





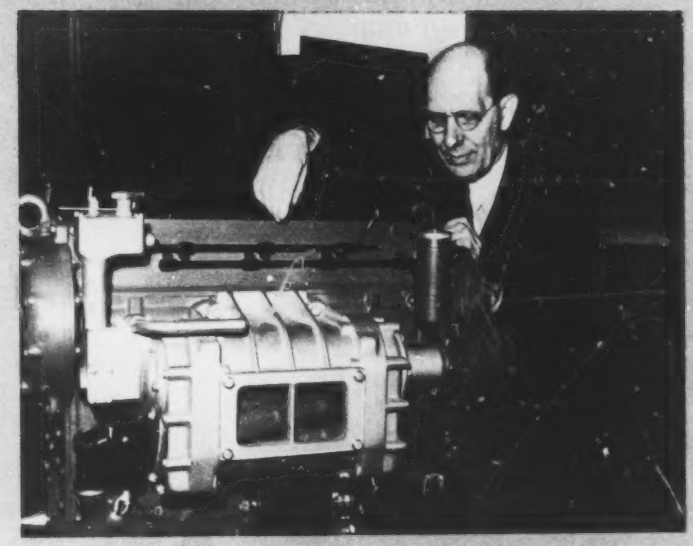
The diesel and the environment

The prospect of more and more diesels on the road has sparked extensive discussion of the possible health effects of their exhaust emissions. Though diesels have little difficulty meeting existing federal standards on hydrocarbons and carbon monoxide, the same is not true for oxides of nitrogen and microscopic carbon particulate matter. The federal government has established a limit of one gram per mile on oxides of nitrogen for gasoline or diesel engines, and 0.6 gpm on diesel particulates for 1982 cars. In future years the NOX rule would remain unchanged, but permissible particulate emissions would drop to 0.2 gpm in the 1985 model year.

Although there has been no resolution of the diesel particulate health effects question, it appears that a knowledgeable body of public health scientists is leaning toward giving the engine a clean bill of health. A blue-ribbon study group, empaneled by the National Research Council, reported earlier this fall that the expected widespread use of the diesel would not create a health or environmental problem. The group also found that the technology necessary to achieve the lower particulate standards did not exist. The group's findings echoed earlier statements by GM. In testimony before the U.S. Senate, the company pointed out that 85 papers presented at an Environmental Protection Agency seminar failed to turn up any conclusive evidence of a public health danger. Furthermore, GM reported that while some experimental particulate control devices had proved up to 80 percent effective, they had failed durability tests.

As it has pursued the technology needed to reduce particulate emissions, GM has expanded its efforts to determine their effect upon public health. At its Technical Center in Warren, Michigan, the company has built a laboratory to study the medical aspects of the question. It has also underwritten a number of similar studies at various universities and independent research institutions.

GM pointed out that only diesel, not gasoline, motor vehicle engines produce significant amounts of particulates, and that these emissions make up less than five percent of this material that is in the atmosphere. Thus the company opposed the tighter limitations, contending they were of doubtful need, unattainable with current technology and excessively expensive. It proposed instead that diesel emissions be



General Motors' inventive genius, C.W. "Boss" Kettering, helped give the diesel engine a new lease on life. Though powerful and durable, the diesel's sluggishness, weight and size made it no match for the gasoline engine in the fight for supremacy. But, by changing the operating principle of Rudolph Diesel's invention from four-cycle to two-cycle and improving its fuel flow, Kettering doubled the engine's power output, dropped its pounds-per-horsepower ratio from 60-to-20-to-1, made it one-fourth the size of a comparable diesel and rescued it from the fate of the steam engine—the graveyard of power generators. After several years of experimentation, Kettering scored his first public success on May 26, 1934, when the Burlington Railroad's "Pioneer Zephyr"—a streamlined, stainless steel passenger train drawn by a diesel-electric locomotive of Kettering's design—raced nonstop from Denver to Chicago in a record 15 hours and averaged better than 77 miles an hour. When the Zephyr pulled into Chicago's Century of Progress Exposition, the lightweight, two-cycle diesel had arrived. Transformation of the diesel to a mobile power plant led eventually to the development of the automotive diesel that seems destined to play an increasingly important role in preserving the country's individual mobility as well as its petroleum resources. Ironically the railroads, whose future was threatened by the loss of passenger and freight revenues to gasoline-powered cars and trucks, found their salvation in the new diesel engine—an engine developed by an automotive pioneer.

controlled through an off-shoot of the "bubble concept" being implemented for factories and other stationary pollution sources.

Under this concept, the atmosphere is seen as a bubble. Within the bubble only pollutant concentrations—not the output of a single engine or family of engines—would be significant. To preserve or attain an acceptable particulate concentration, GM suggested that allowable averages for the emissions of the diesel fleet of each manufacturer be established. Such a "mobile bubble" would continue to protect the environment, while averaging the emissions of all of its diesel engines would enable the manufacturer to produce the mix of engines that would meet the standard. It would also forestall the installation of additional control devices until their need and effectiveness had been determined.

Cleaning up the diesel's exhaust is complicated by the fact that reducing one pollutant increases others. Recirculating exhaust gases to lower the engine's operating temperature cuts NOX, but raises the output of particulates and hydrocarbons. GM has been given a waiver, as provided by the statutes, from one to 1.5 gpm for two years on oxides of nitrogen from its V-8 passenger car diesels and a one-year waiver on the new V-6, but the technology available today is not able to meet the more stringent limitations on NOX and particulates simultaneously.

Future exhaust emission standards may be changed as the Congress takes up possible revision and reauthorization of the Clean Air Act. The auto manufacturers are hopeful that the NOX standard, in particular, will be eased. Otherwise, they contend, continued increased use of the diesel is seriously at hazard. Meanwhile, the evolution of GM's diesel engines goes forward.

Diesel technology surges

Typical of the advances that have been accomplished are those reported by Oldsmobile for its new, six-cylinder engine. Installed transversely in the new midsize, front-wheel-drive Ciera, the engine will deliver 42 mpg on the highway, and an estimated 28 mpg in the city. With a 17-gallon tank, the car will have a cruising range

"Cleaning up the diesel's exhaust is complicated by the fact that reducing one pollutant increases others."

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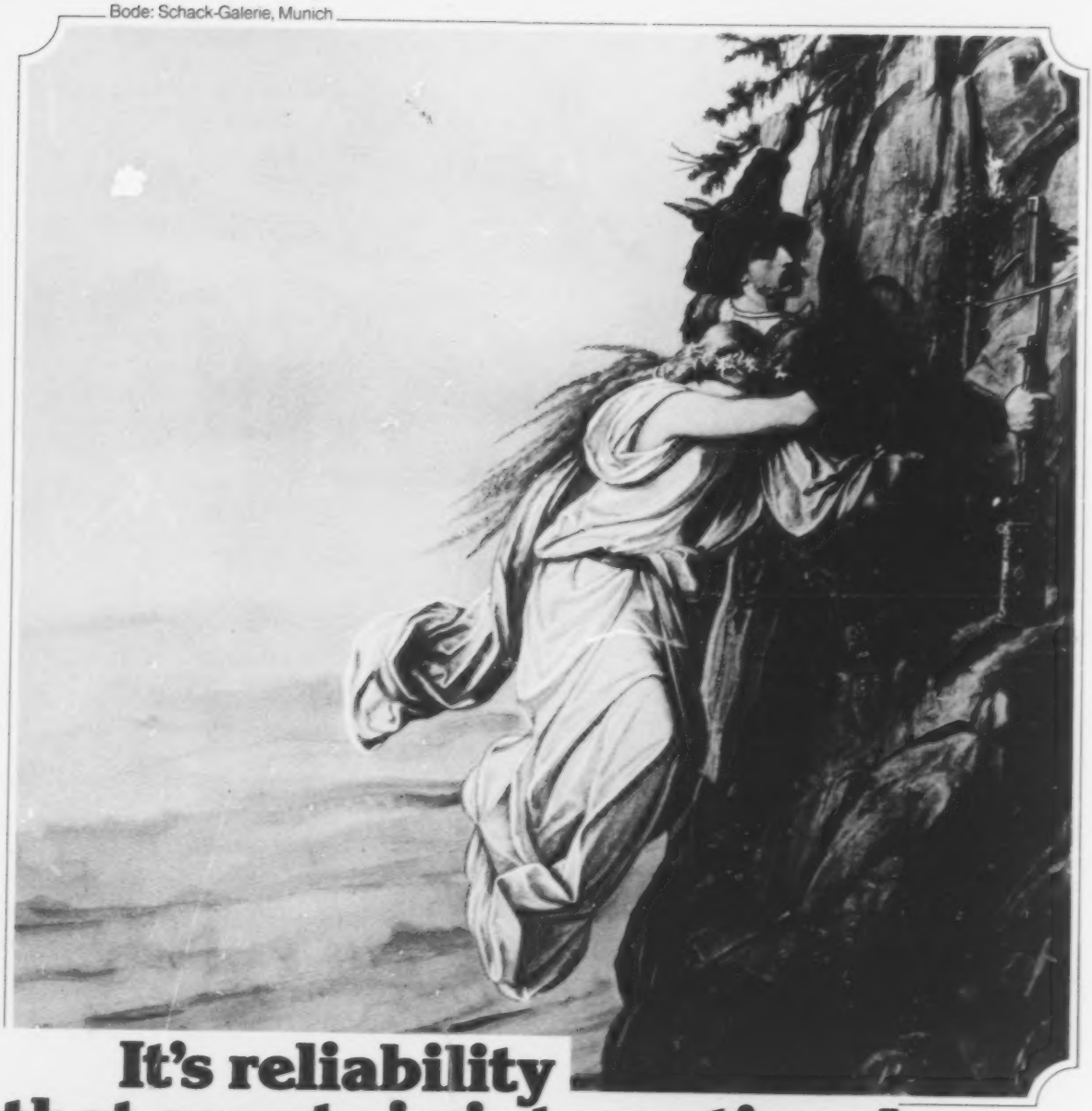

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of 714 miles. By comparison, the 1978 V-8 Olds diesel, powering a full-size station wagon with a 27.3 gallon tank, got about 22 miles to the highway gallon and had a range of some 600 miles.

On the '82 diesels the oil and oil filter change interval is 5,000 miles; on the '78 model the mileage between changes was 3,000. The weight of the new engine—200 lbs. under the V-8—has been achieved by using aluminum for the oil pump body, cylinder heads, water outlet and intake manifold.

Advanced combustion chamber design has improved fuel economy and reduced particulate emissions to less than half of those of earlier models. Experiments with fuels and additives are aimed at further particulate reductions. Fuel improvements will depend upon the petroleum industry as will another factor that affects the diesel's future—the price of diesel fuel. The growing popularity of the engine has paralleled the rising cost of gasoline. As gas pumps have borne ever-higher prices the past few years, thrifty motorists have turned to the diesel for improved mileage and lower fuel costs.

"The growing popularity of the engine has paralleled the rising cost of gasoline."

And though market conditions have caused diesel prices to approach those of gasoline, the diesel's 25 percent edge in efficiency has created a growing demand from buyers of small, medium and full-size cars.

General Motors, which plans to go on manufacturing a full line of automobiles, is betting that demand will continue to grow.■

DEUTSCHE ZUSAMMENFASSUNG

Als Rudolf Diesel zum ersten Mal versuchte, den Motor anzuwerfen, den er erfunden hatte, explodierte die pulverisierte Kohle, die er als Treibstoff benutzte. Zur Zeit findet eine neue Dieselexplosion statt, aber diesmal ist es ein "boom" und nicht ein Knall. Es explodieren die Kaeuferzahlen fuer amerikanische Personenwagen und Kleinlaster mit Dieselantrieb.

Es war die Firma General Motors, die 1978 als erster der grossen US-Hersteller wahlweise Dieselmotoren fuer ihre Pkw-Modelle der Marke Oldsmobile anbot. Der Firma war es gelungen, dem klassischen 350-cubic-inch V-8 Benzinmotor eine dieselgetriebene Alternative zur Seite zu stellen, eine 5,7 Liter Maschine mit 105 h.p., die bei gleicher Treibstoffmenge 25% weiter fahren konnte als die Benzinmaschine. Um 900 Pfund haette man ein Auto leichter machen muessen, das bei gleicher Treibstoffmenge mit einem benzingetriebenen Motor genauso weit fahren sollte, wie mit der entsprechenden Dieselversion. Fuer General Motors war es wichtig, eine Maschine zu entwickeln, die es erlaubt, das gewohnte volle Fahrzeugprogramm, auch der Groesse nach, weiterhin anzubieten und gleichzeitig dem Kundenwunsch und den gesetzlichen Anforderungen nach wirtschaftlicheren Motoren nachzukommen.

Im Jahr der Markteinfuehrung konnte Oldsmobile nur 31.000 Dieselautos verkaufen. Die Absatzzahlen stiegen jedoch rasch an. 1980 waren es schon 387.000 Diesel, und im laufenden Jahr sollen es weitere 22% mehr werden, ca. eine halbe Million; auf die volle Million verkaufter Dieselautos hofft General Motors im kommenden Jahr 1982. Diese Entwicklung wird angesichts sinkender Absatzzahlen fuer grossvolumige, herkoemmlich angetriebene Autos mit grossem Interesse verfolgt. Bisher verkauft ausser GM nur Volkswagen dieselgetriebene, in USA hergestellte Autos. General Motors hat dabei einen Marktanteil von 55%, der verteidigt und ausgebaut werden soll. So hat die Firma Chevrolet, die ebenfalls zum GM-Imperium gehoert, eine 6,2 Liter-Maschine (378 cubic-inch), 130 h.p. V-8 Diesel, entwickelt, die vorzugsweise fuer Kleinlaster, Minibusse und Motorkaravans gedacht ist; Oldsmobile hat einen 4,3 l Dieselmotor (262 cubic-inch), V-6 mit 85 h.p. auf den Markt gebracht, der als "fuel super saver", als Super-Treibstoffsparer, fuer die mittelgrossen Fahrzeuge von Oldsmobile, Buik, Pontiac und Chevrolet angeboten werden soll. Zur Herstellung dieser Dieselmotoren sind im GM-Bereich eigens zwei neue Betriebe eingerichtet worden.

Gefahr droht der Dieselzukunft in USA von den Umweltschutzbestimmungen. So gut die verfuegbaren Dieselmotoren im Rahmen der Standards fuer Kohlenwasserstoff- und Kohlenmonoxyd-Emissionen abschneiden, so schwierig wird es bei Stickstoffoxyd (NOX) und Rauch. Hierzu ist eine Diskussion in USA entstanden, die klaeren soll, wie sich die Einfluesse einer dieselangetriebenen Autogeneration in den Vereinigten Staaten auf die Atmosphaere auswirken werden. Vorlaeufig hat General Motors, hinsichtlich der noch nicht erreichten Standardwerte bei Stickstoffoxyd, Ausnahmegenehmigungen der Umweltschutzbehoerde erhalten, auf zwei Jahre fuer den V-8 Motor und auf ein Jahr fuer den V-6 Motor.

Amerikanische Befuerworter des Dieselmotors hoffen, dass die entsprechenden Vorschriften des Gesetzes ueber die Reinhaltung der Luft (Clean Air Act) so abgemildert werden, dass sie von den Herstellern eingehalten werden koennen. Inzwischen steht die Entwicklung nicht still; nach einer Verbesserung der Emissionswerte der Dieselantriebe wird angestrengt gesucht. Dabei kommt auch die Technologie generell voran. Die Motoren werden immer genuegsamer und wartungsfreundlicher. In den Anfaengen gab es hier noch erhebliche Probleme bei amerikanischen Dieselmotoren. Mittlerweile ist der wirtschaftlich denkende amerikanische Autofahrer laengst von den Vorteilen des Diesel ueberzeugt. GM geht davon aus, dass es seine volle Autopalette, auch die Grossmodelle, gerade wegen der Verfuegbarkeit von diesen Maschinen, auch weiterhin bauen kann und setzt auf die Zukunft des Dieselmotors in den Vereinigten Staaten.

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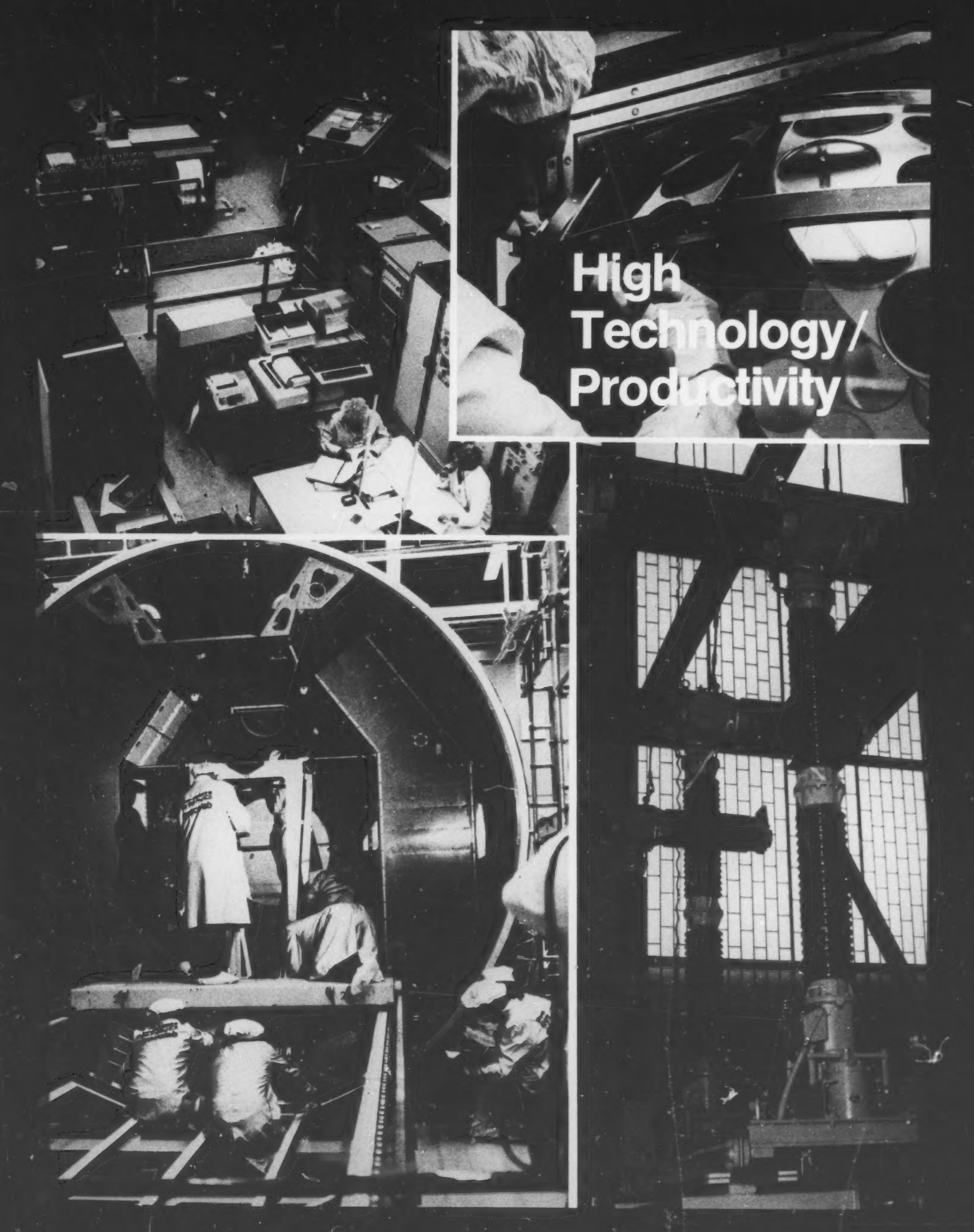
Siemens...On the scene.


High
Technology/
Productivity

Robots: Opportunity to Automate

by Dr. Julius A. Mirabal
General Manager,
Automation Systems Operation,
General Electric Company

The word "robot" used to conjure up images of science fiction movies in which mechanical men were directed by deranged scientists to perform certain deeds, or misdeeds.

No longer the province of science fiction, the term robotics today reflects a great prize presented to us by technology, making possible vast productivity improvements in manufacturing and a variety of benefits in special applications. Let's take a look at robots in the manufacturing environment, the key focus of automation systems in the push toward increased productivity in this decade.

Robotics presents an opportunity for management to control costs and boost productivity while improving working conditions by alleviating dangerous, monotonous or unhealthy jobs better suited to machines. The deeds these robots can perform are all good deeds.

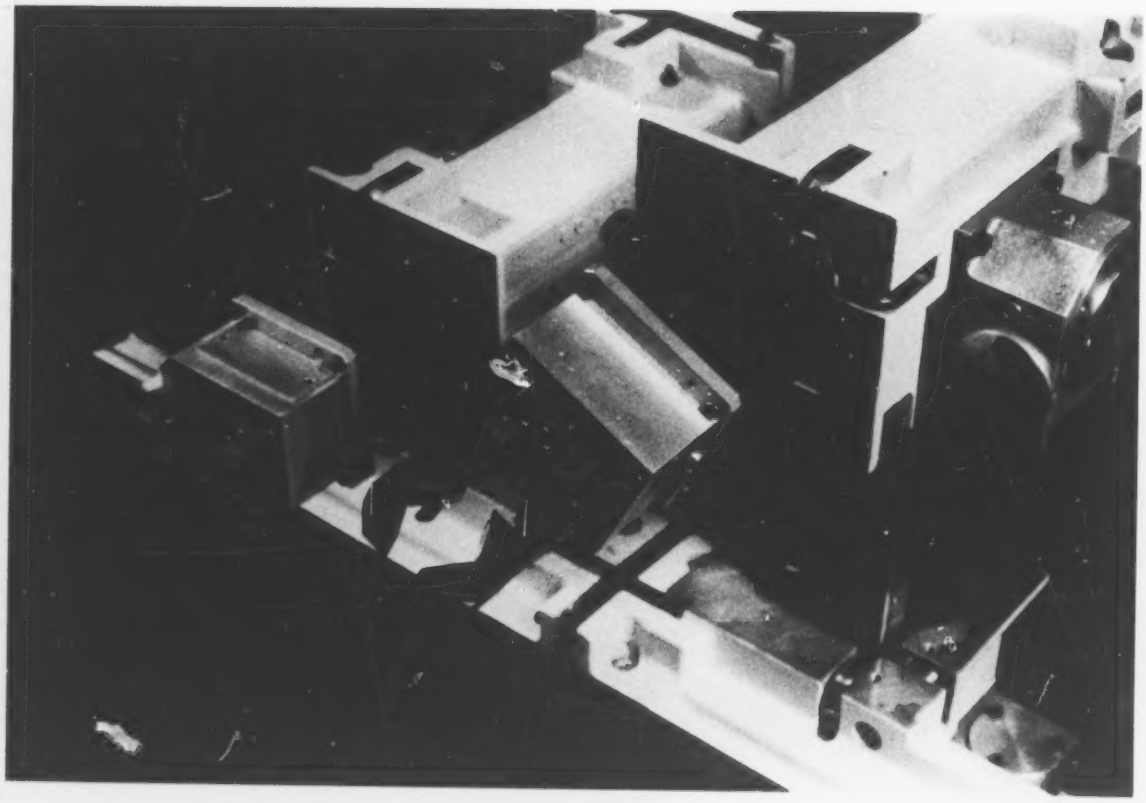
Industries worldwide, and especially American and German industries, are being driven by severe economic pressures to substantially improve product quality and productivity: elements essential for industrial survival in today's tough international competition. There is also a continued emphasis to improve work environments, particularly in such areas as paint booths and high temperature situations.

These factors, together with technology's capability to respond economically to industry needs for flexibility, efficiency and reliability, create an attractive robotics market growth picture. The North American robot systems market alone is widely expected to have constant dollar growth from the mid $60 millions in 1980 to in excess of $500 million by 1985 and $1.5 billion by 1990. Some segments, such as the assembly robot sales, are expected to experience ten year average annual growth rates in excess of 50 percent.

"The U.S. domestic robotics industry will likely grow at a 30-35 percent rate a year over the next ten years."

The major thrust of General Electric's Automation Systems Operation is to become a major supplier of computer-controlled manufacturing systems, with an initial focus on robot systems.

As one of the largest, most diverse companies in the world, General Electric is fortunate to have within itself a large market



for industrial robots in which to carefully study and improve the assimilation of robots into the manufacturing cycle. In 1976, we started with a robot applications lab in an effort to properly tailor automation systems to each particular factory application. Once we gained expertise in that essential area, and in others, it soon became apparent that we should create an Automation Systems Operation to handle manufacturing, sales, service and design of robot systems.

Robots at home and abroad

The opportunity for assembly line automation in the automotive industry is widely known. Automated welding robots became a staple of the automotive industry, and small, simpleminded "pick-and-place" and "load-unload" robots are becoming ubiquitous. General Motors has recently said that it will install 14,000 new robots by 1990, at a cost of over $1 billion. To give you an idea of what kind of explosive growth this reflects, that number is more than all the robots in use in the United States today. The U.S. domestic robotics industry will likely grow at a 30-35 percent rate a year over the next ten years. Staggering...but quite necessary if we are to keep up with the likes of Japan, West Germany, and the USSR. And the growth rate is likely to accelerate in the following decade.

In the U.S., there is no doubt that automation systems have reached the attention of senior management, and that's a good sign. One fact of manufacturing life might have prompted the realization: fully 75 percent of all U.S. manufacturing is done in short production runs, the ideal places for instituting robotics and other automation systems, such as computer aided design and manufacturing, CAD/CAM.

U.S. Manufactures Lag Their Overseas Competitors in Productivity Gains

Annual pct changes in productivity, manufacturing

	U.S.	Japan	W. Germany
1970	-0.3	12.7	2.4
1971	5.4	3.1	4.6
1972	5.1	7.5	6.0
1973	2.7	11.6	6.1
1974	-5.2	0.3	6.1
1975	5.0	-3.9	4.3
1976	4.4	8.1	5.9
1977	3.1	3.8	5.4
1978	0.6	5.1	3.6
1979	1.5	8.3	5.2
1980	-0.5	6.2	-0.7

Source: U.S. Department of Labor, Bureau of Labor Statistics

On the foreign scene, recent news reports show that the Russians are taking robotics very seriously, too, and that they have six or seven thousand robots presently operating in

their country. I should note here that two-thirds of these robots are of the relatively simple pick-and-place variety, but the Russians have plans to build 40,000 more robots over the course of a current five-year plan to upgrade their manufacturing facilities and improve productivity, the lowest of all the industrialized nations of the world. They know they'll need those robots to be able to compete with the West and Japan, and to help alleviate their high alcoholism/absenteeism problems.

Entry into this rapidly growing robotics market is an integral part of General Electric Company's thrust to serve the so-called Factory of the Future.

To achieve the objective of developing a profitable business focused on growth market segments, GE is applying its current strengths to provide:

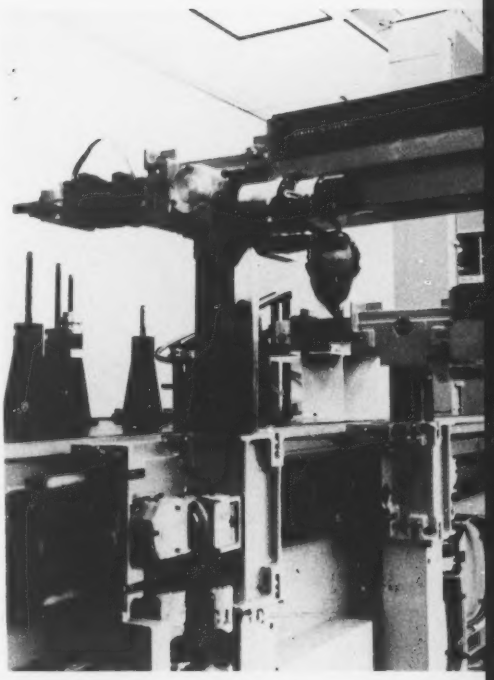
- Superior product performance through sustained technical innovation in a rapidly developing technology.
- Broad industrial marketing capability including extensive applications expertise.
- Product reliability and maintainability backed up by a strong worldwide service organization.
- And financial strength and commitment for expansion to support the market growth and development programs to sustain technical initiatives.

"Entry into this rapidly growing robotics market is an integral part of General Electric Company's thrust to serve the so-called Factory of the Future."

We have been very active in the evaluation of worldwide automation technology. We have detailed systems performance knowledge and applications expertise across a broad spectrum of applications—welding, spraying, machine unloading, assembly and extensive development and application work with vision, including the GE developed solid-state camera system.

This research led us to effect an agreement with DEA of Italy last July, under which we have acquired a worldwide license covering DEA's assembly robot system technology. A second agreement with Hitachi Ltd., of Japan, has brought three other types of robots—welding, spraying, and process—to the GE product line.

Of course, this technology is first being directed to applications where there is the most demand for high productivity and efficiency, such as automobile assembly lines where parts assembly, welding, and paint and lubricant spraying are done in high



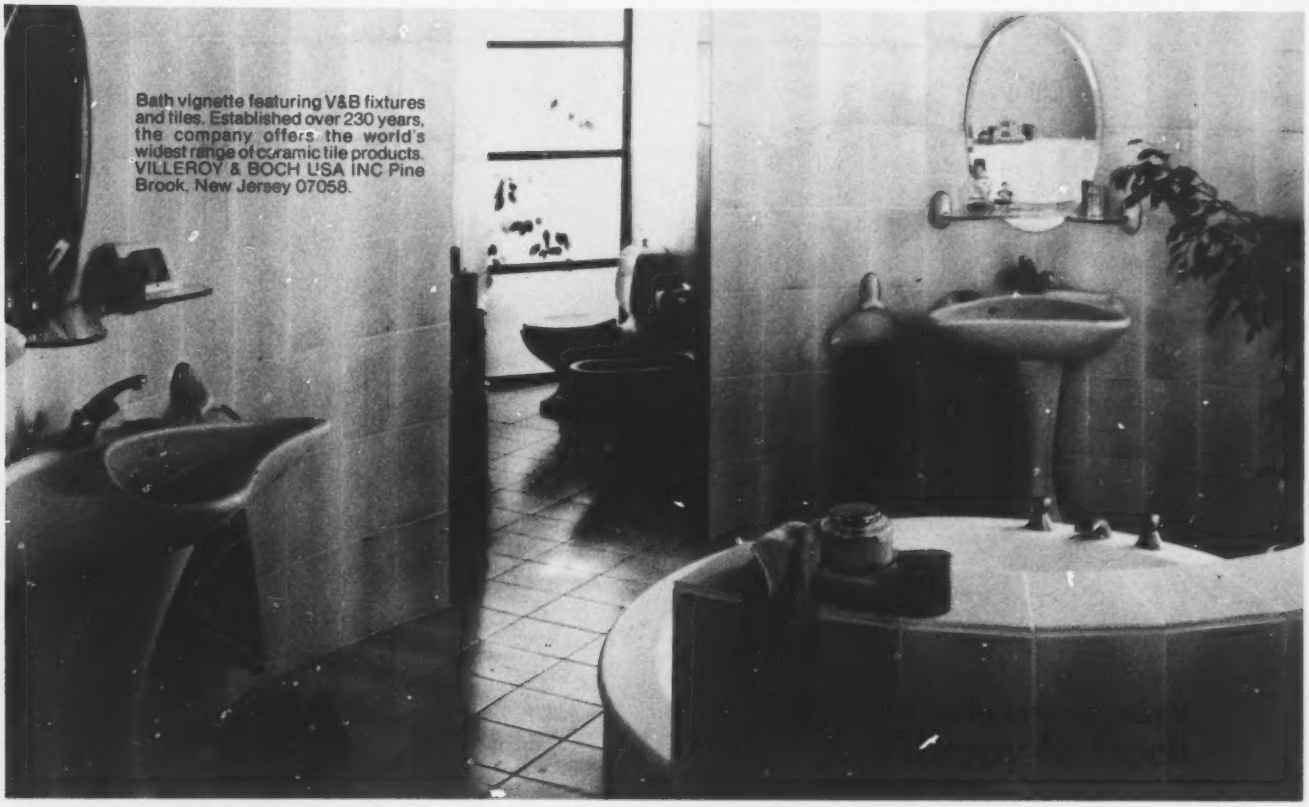
volume. Here the investment in robots is most cost-effective at current prices. But robots are also being used in specialized applications, in such areas as toxic chemical handling, radioactive waste handling and disposal, and other dangerous or uncomfortable (extreme heat, cold) environments.

In the present decade, in which robotics will become an established tool of industry, humans will come to realize that robots provide only the "brawn," while humans provide the brainpower with which to program these computer-controlled machines.

Technical ingenuity and the power of positive thinking made robotics a reality, but it will take a great deal more positive thinking, patience, trust and cooperation to make robotics a broad success. Remembering the limitations of robots will help us deal with many misconceptions that may arise.

A wide spectrum of benefits

The fact is, technology has brought us a great prize in the fight for higher productivity and quality. As in any technological development that changes the way we've done things, there will be the timeless difficulty of breaking habits, but with a skillful, professional transition from one manner of doing things to another, we can move the factory forward, out of its present lethargy and into a new era of high productivity and quality that will enable organizations to better compete with domestic and foreign manufacturers.


Bath vignette featuring V&B fixtures and tiles. Established over 230 years, the company offers the world's widest range of ceramic tile products. VILLEROY & BOCH USA INC Pine Brook, New Jersey 07058.

For example, when we get GE's locomotive operation revamped with automated systems, it will produce 50 percent more locomotives with only a 15 percent increase in floor space and a 20 percent increase in personnel.

Note, I said 20 percent *increase*, not decrease in personnel. On that score I'd like to note that the American workforce will be the *beneficiary* of the productivity revolution we intend to lead, not the victim. Without these advances the trickle of jobs to overseas will become a torrent.

In the halcyon days of the Fifties and Sixties, U.S. productivity increases tripped along at a healthy 2.5 percent per year, but in the Seventies it dropped to less than 1 percent. In 1979 it actually declined, and preliminary 1980 figures are not encouraging. The U.S. still leads the world in productivity, but it's small comfort to be flying higher than the competition if you're running out of gas.

It doesn't have to be that way. We *can* get our second wind.

We now have a government that appears to note the connection between a tax system that discourages investment in new plants and equipment and the productivity coma that system inevitably produces.

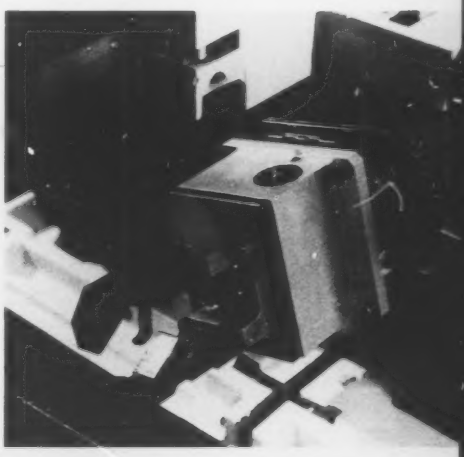
We've got a manufacturing community that is awakening rapidly to the productivity miracles that lurk in microelectronics.

"On that score I'd like to note that the American workforce will be the *beneficiary* of the productivity revolution we intend to lead, not the victim."

And, if I may indulge in intangibles, we have a nation that has no intention of sliding into second place in productivity, a talent that made it what it is.

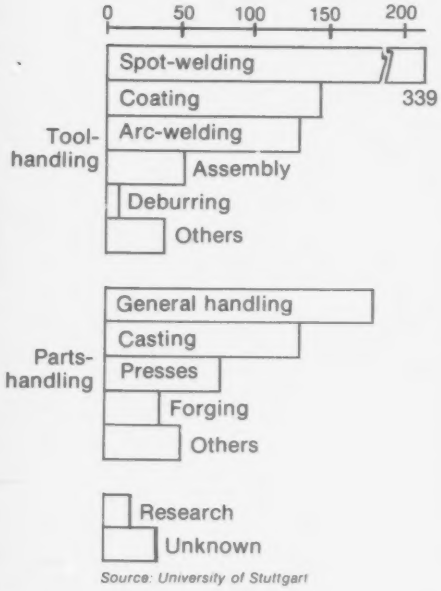
As far as GE goes, our company has a good start, since we have many of the building blocks with which to make the automated Factory of the Future a reality, but many billions are yet to be spent in closing a loop that technology keeps expanding. We have the experience, the commitment, and the resources in *all* the requisite technologies to achieve critical mass and produce the productivity explosion that will bring a good thing *back* to life—thus renewing our American Industrial Base.

The Japanese experience shows us that robotics can be used with great success in improving quality and productivity, while keeping costs down. And that this can be achieved without negative side effects. The



What they do

Number of industrial robots in Germany, August, 1980



Source: University of Stuttgart

Japanese have shown us all too well that high employment, quality and productivity are compatible elements in the automated manufacturing environment.

Robotics will increasingly be viewed as an advantage in this tough competitive industrial environment, but it will take big doses of cooperation to achieve success. I believe attitude is the key to any organization's success in a new area. A positive attitude, combined with this great technology, will assure an exciting and rewarding future.

And what of the future?

What does the next generation of robots—extending into the 21st century—hold in store?

First, we are going to see robots handling increasingly complex tasks. Computer controlled robots, for example, will assemble, and then test, complex products such as electric motors and electrical instruments.

Robots also will be far smarter than they are today, because they are going to be directed by powerful mini-computers—small, inexpensive information processors made possible by the on-going revolution in microelectronic technology. These robotic brains will act on information provided by a variety of sensors—visual, aural, tactile—which will enable them to make judgmental decisions much as human beings do now. And, in some ways, robot sensory awareness may be even keener than human; for example, if infrared heat detection is utilized.

By the year 2000, it will be increasingly difficult to identify a robot from other automation systems. The picture will be blurred because robots will no longer be just individual contributors to the manufacturing process but part of an integrated system, interfacing with computers and numerical-controlled machine tools.

But one thing is clear: Robots are here to stay. They are making significant contributions to industries worldwide and will continue to do so as technologies develop, merge and expand capabilities. ■

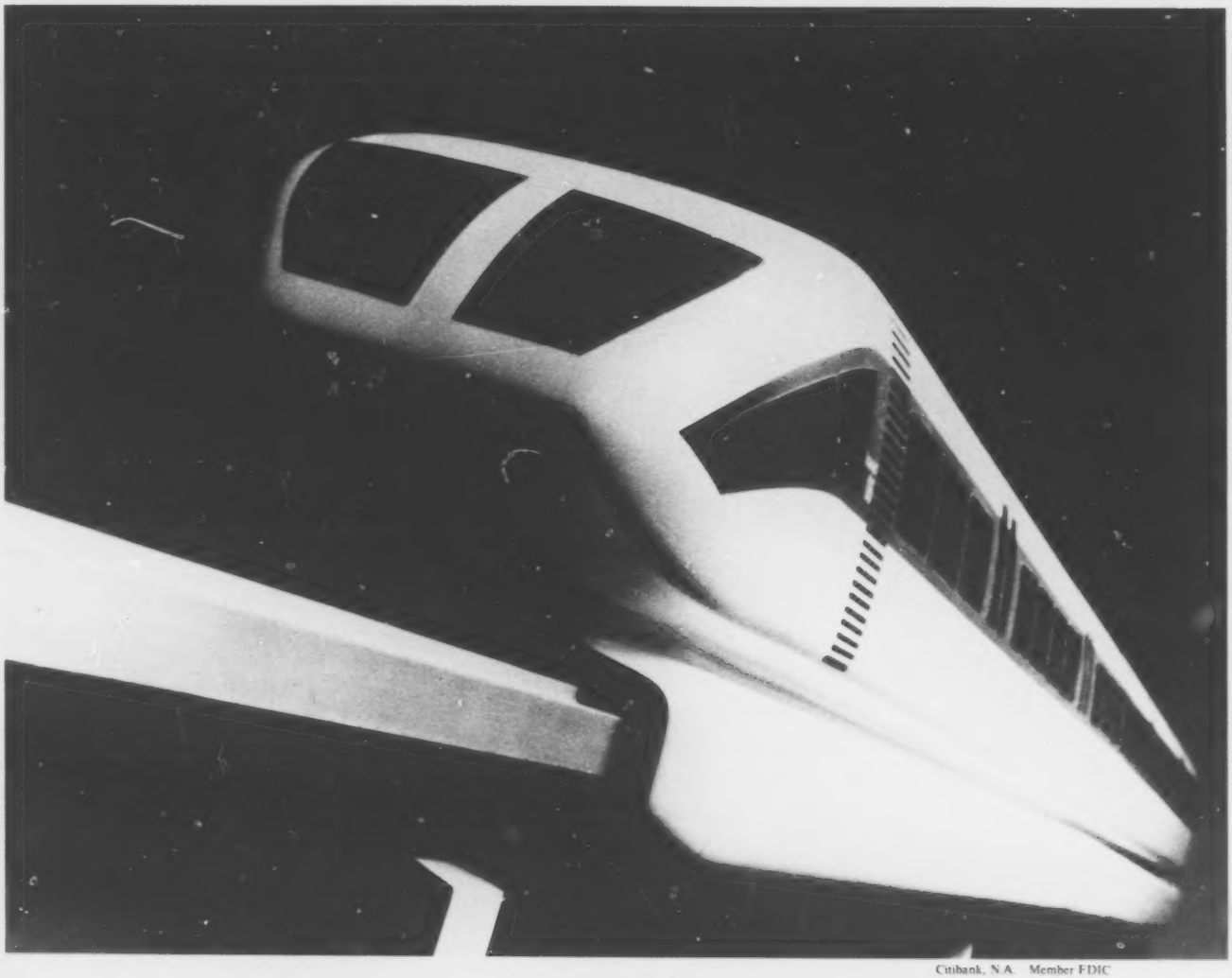
DEUTSCHE ZUSAMMENFASSUNG

Die Roboter sind unter uns, aber nicht als gefuehllos bedrohliche Maschinen aus dem Zukunftsroman, sondern als nicht mehr wegzudenkender Beitrag zur weiteren industriellen und technischen Entwicklung. Nur mit Hilfe der Roboter wird es schliesslich gelingen, Produktivitaet und Qualitaet, auch die Lebensqualitaet, erneut deutlich und dauerhaft zu erhoehen und den Herausforderungen des technischen Wettbewerbs der Zukunft gerecht zu werden. Roboter koennen dank fixer Betriebskosten und Leistungsdaten den Unternehmensleitungen das praezise Planen von Kostenfaktoren und Produktivitaetssteigerungen ermoeglichen, weil sie koennen die Betriebsbelegschaften vom Joch vieler gefaehrlicher, monotoner oder gesundheitsschaedlicher Arbeitsvorgaenge befreien, die sie als "intelligente" Maschinen, immun gegen Unaufmerksamkeit, Langeweile und schaedliche Daempfe, zuverlaessig und klaglos erfuellen koennen.

Die amerikanische Roboter-Industrie sieht sehr zuversichtlich in die Zukunft. Sie erwartet ein Anwachsen ihres Marktes von 60 Millionen Dollar 1980 auf 500 Millionen Dollar 1985 und auf 1,5 Milliarden Dollar schon 1990. Fuer einzelne Bereiche des Roboter-Marktes, etwa bei Montagerobotern, wird eine jaehrliche Marktzunahme von 50% erwartet. 14.000 solcher Roboter will alleine die Autofirma General Motors bis 1990 bei sich aufstellen. Die amerikanische Roboter-Industrie rechnet sich fuer die begonnene Dekade Wachstumschancen von 30% bis 35% pro Jahr aus; fuer die fernere Zukunft werden unter dem Konkurrenzdruck aus Japan, Deutschland und der Sowjetunion, noch hoehere Zuwachsraten des Roboter-Marktes prognostiziert. Dabei eignet sich besonders der amerikanische Markt fuer den Automateneinsatz, denn dort sind schon heute 75% der Arbeitsvorgaenge kurz und automatengerecht eingerichtet.

Besonders die US-Firma General Electric bemueht sich um den Aufbau der notwendigen Kapazitaeten zur Roboter-Herstellung. Sie hat entsprechende Forschungseinrichtungen zusammengestellt und auch internationales Know-how in Italien und Japan zugekauft. Die Firma will zu einem Hauptausruester der "Fabrik der Zukunft" werden, die man sich ohne Roboter nicht mehr vorstellen kann. Dabei koennen diese Roboter eines Tages sehen, hoeren und tasten und sogar Entscheidungen treffen; sie koennen schon heute schweissen, spruehen, montieren, fraesen, schmieden und schneiden. Ihren Anwendungsbereich finden sie dort, wo Produktivitaet und Praezision besonders dringend gefragt sind, am Autofliessband. Aber auch beim Umgang mit chemischen Stoffen, giftigem Muell und radioaktivem Abfall besteht schon heute ausreichender Bedarf fuer den Roboter-Einsatz. Im Laufe der Jahre werden Roboter in der Industrie zur Selbstverstaendlichkeit werden. Bis dahin ist jedoch noch ein weiter Weg im technischen und innovativen Bereich zurueckzulegen. Ein noch weiterer Weg liegt im sozialen Bereich vor dem Grosseinsatz der Roboter. Neue Arbeitsweisen werden einzuhalten sein. Neue Arbeitsplaetze werden entstehen, wo die Roboter bestehende Arbeitsplaetze besetzen. Die Industrie wird dabei aus dem gegenwaertigen Stillstand in ein neues Zeitalter der qualitativen und produktiven Hochleistung vorstossen koennen.

Und die Zukunft? Hier sieht man computergesteuerte Roboter bei der Montage, bei dem Probelauf und der Endabnahme von elektrischen Motoren und Instrumenten. Roboter werden immer klueger werden, immer mehr dazulernen, denn sie werden von sehr leistungsfaehigen Kleinstcomputern gesteuert sein, kleinen, billigen Informationsprozessoren, die durch die Revolution der Mikroelektroniktechnologie ermoeglicht werden. Im Jahr 2000 wird der Roboter schliesslich seine Automatenindividualitaet verlieren und zunehmend zu einem Teil von komplexen, integrierten Automatensystemen werden. Vieles wird mit den Robotern moeglich werden, nur eines nicht,—sie werden nicht mehr aus unserer technischen Welt verschwinden.



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It is significant, but not surprising, how often companies like this, with an eye to the future, look to Citibank. They find here the compatibility of a bank known for innovativeness—in services ranging from direct loans or corporate cash management to sophisticated merchant banking. Plus the resources of a leading international bank, with branches, subsidiaries and affiliates around the world.

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The New Knights with Iron Fists

by Udo Wuest
Editor in chief,
BMW Journal

Everyone knows what a robot looks like—at least everyone who's been exposed to a little science fiction. Like a human being, pretty much. It moves about awkwardly, walking in clumsy half-steps; has over-dimensioned, square-edged arms and legs. An electronic brain, located in its head—which naturally has antennae and blinking lights—controls its metal body. It speaks with the sonic quality of a portable radio.

Everyone seems to know, too, what a robot can do. But not everyone agrees. Some say he is omnipotent, representing the solution to all our future problems. Others see him as a thief, robbing human beings of work—or, more precisely, jobs.

What a robot really is—well, as it turns out, very few have any idea. In the soberest, coolest of terms, it is quite simply a machine. A very complicated machine, yes, but by no stretch of the imagination the eighth wonder of the world. A machine with a high degree of automation, capable of doing many things.

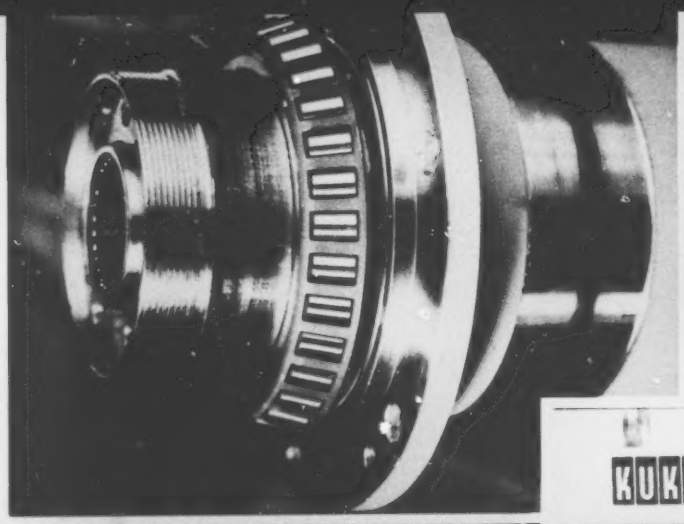
But a little more definition is needed; so far we have not really differentiated between a mere production machine and the type of machine that is making so many headlines today.

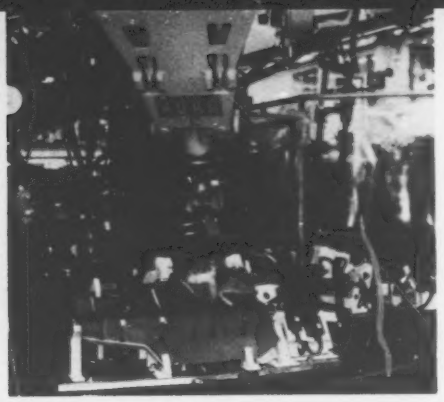
The somewhat labored comparison of science fiction's classic anthropomorphic robot with a human being may not have been very serious. But it can help us understand why a particular evolutionary form of the automatic production machine has come to be called a robot.

The human arm has 27 degrees of freedom of movement, say physiologists. To these, add the hand's further 24 degrees of freedom. It would be asking too much to expect so many possible motions from any machine—at least up to now. For the uses to which today's robots are being put, it would also be quite unnecessary: so far, between five and seven degrees of freedom are adequate.

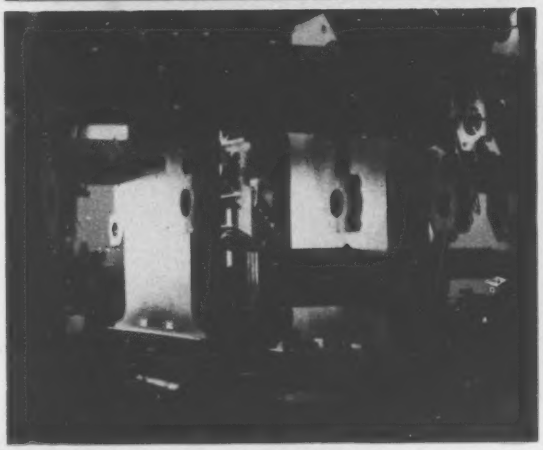
This versatility plus freely programmable, servo-driven motions are what constitutes today's production robot. It is an automaton: one capable of carrying out this function today, in all likelihood more functions tomorrow. Computer-controlled, highly versatile production robots, for all the furor they have generated in the past five years, are still relatively rare: there are only some 13,000 of them in the world. About a third are at work in the United States, a third in Europe and a third in Japan.

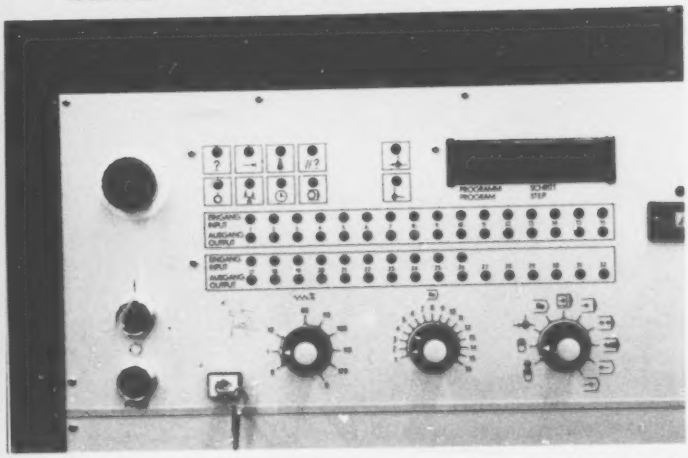
Very few people have any idea of what a robot really is.





KUKA Robot Control





The headlines have tended to oversimplify, particularly in the much-discussed area of automobile production—which certainly lends itself particularly well to the use of the devices. But when statisticians tick off 40,000 of them alone in Japan, they are also counting the relatively simple breed of pick-and-place machines: the kind that place parts in the right cubbyhole of a large bin or remove and transfer them someplace else, for instance. The kind that carry out purely mechanical, quite limited operations involving motions around no more than three axes. In wide use in many countries besides Japan, these devices actually shouldn't be counted as robots or figured into Japan's real or alleged advantages in productivity.

What must be counted are the sophisticated, programmable production machines that have made such deep inroads into the manufacturing and assembly processes, replacing human beings in work of considerable precision and direct importance to the quantity and quality of the finished products. In modern automobile production, they are becoming an integral part of new or newly equipped factories that boast flexibility heretofore unknown in the business. Robots, as we are coming to know them, can accommodate product changes as well as varying production quantities and mixes in remarkably little time and with astoundingly low costs.

"In modern automobile production, they are becoming an integral part of new or newly equipped factories that boast flexibility heretofore unknown in the business."

All of which are impressive achievements, to be sure. To learn how robots are made, what they can do and how they programmed for their various jobs, we visited the KUKA plant in Augsburg, West Germany, traditionally a specialist in welding technology. Of late, the company has plunged into intensive development of welding robots—a natural, as it's welding operations where the machines are finding the most applications in Germany.

Anyone who has watched welding operations in an industrial plant will readily understand why. Until recently done mostly by hand, welding is one of the least bearable, most demanding kinds of work involved in producing an automobile body. In one stroke, a welding robot relieves human beings of the unpleasant labor—and accomplishes it with precision no human

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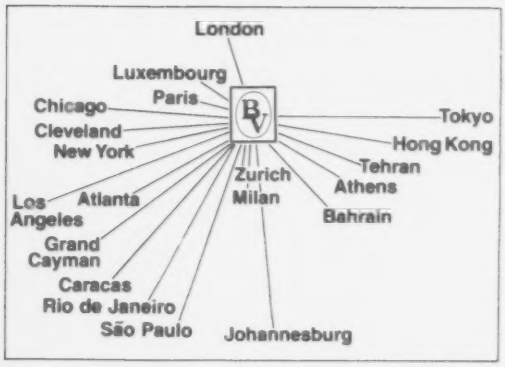

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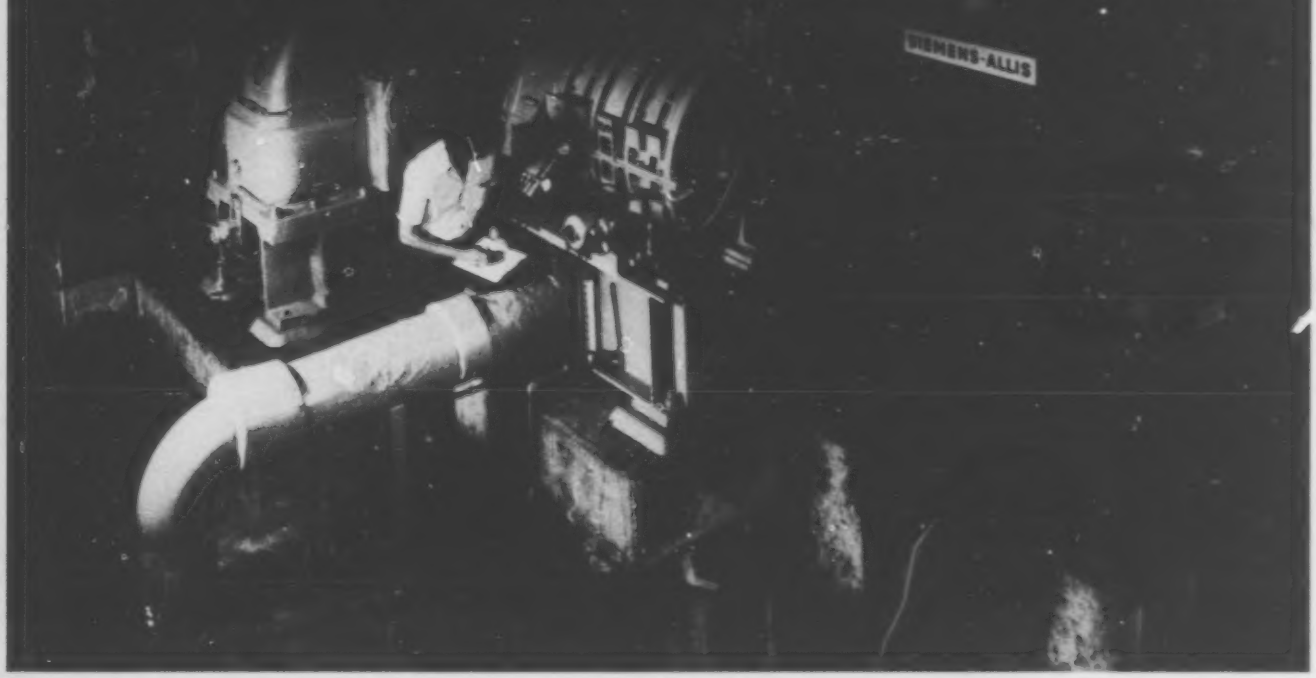


being can match in volume production. Not to mention speed: The typical robot moves in on each of its multitude of weld points at a good 2½ meters per second—that's more than eight feet per second—and hits it with no more than a millimeter (less than 1/25 of an inch) variation in any direction.

The machine that welds with such speed and accuracy looks something like a cannon. Its working arm is mounted on a rotating carriage (axis 1) and can move forward and backward (axis 2) as well as up and down (axis 3). Three further degrees of freedom—axes 4 through 6—make its "hand" maneuverable in the operations it carries out.

In this case that "hand" is wielding a welding tong weighing more than 130 pounds—and wielding it 'round the clock, if need be. It looks a bit like shadow-boxing as it makes its moves, jerking from one point to the next in fractions of a second within its almost thousand-cubic-foot "envelope" of movement space. Indeed, it would be a devastating K.O. if someone crossed its path.

No surprise, then, that such a robot is shielded by a protective fence so that no human being gets in its way as it jerks from welding point to welding point at a rate of about forty a minute. Forty times a minute, and every time with the same extreme precision, coming in at the right angle even when it's an awkward cranny.

At BMW, about eighty such robots are already at work. Their manufacturer says they will last ten years, working two shifts a day. That's a lot of welding, even for an investment of 280,000 Deutsche Mark (about $112,000 at the current exchange rate). And it's a lot of progress from the days of hand welding.

But progress is going right on. Here BMW itself has contributed to the evolution of robots; KUKA's latest welding robot is based partly on BMW patents and will soon be going into use at the auto maker's Dingolfing factory. Called a "portal robot" because it hangs from a movable overhead frame, it has an extra degree of freedom along the portal's longitudinal axis. Soon it will replace the conventional overhead welding apparatus on the body transfer line; the portal robot is new in conception, in that it takes up the reaction force that results when the welding device snuggles up to an autobody part. In earlier welding robots, this force had to be dealt with by the tongs; the portal robot has no tongs.

"Clearly, not just the robots' mechanical flexibility but also their programming possibilities are the key to increased productivity."

Body-production experts expect a further increase in productivity from the portal robot, which promises even greater flexibility when it comes to building various car models on the same transfer line. When it goes into use, BMW will have one of the most advanced welding operations in the world's automobile industry.

Clearly, not just the robots' mechanical flexibility but also their programming possibilities are the key to increased productivity, and it is the latter that is their maker's biggest challenge. To make sure it is at the forefront of robot technology, KUKA has an impressive variety of professionals working in engineering development.

Mechanical and electronics engineers conceive the basic systems, abetted by the software people, the mathematicians and the electronics and mechanical technicians.

The typical production robot has a control center about the height of a human being, and here is where robot technology is at its most fascinating. It is full of microelectronics, naturally, that faithfully store the desired movements and then guide the machinery in reproducing them. DC motors provide the actual movements and forces, at the command of the microelectronics.

Just as naturally, body welding is by no means the only phase of automobile production where sophisticated robots can be put to work. Plating, casting, machining and assembly operations are also among their capabilities.

Those capabilities are growing steadily: finishing off castings and assembling auto wheels are already on the horizon. But the people developing robots know that they are merely on the threshold of what can be done with the machines' combination of electronic and mechanical functions. Sensors—already at work under the hood of today's cars, helping to control emissions and improve efficiency—are also part of the newest robots' innards, and they are being refined constantly. It is conceivable that through such sensors, tomorrow's robots will pick up some other human traits, like the ability to "see" and "touch."

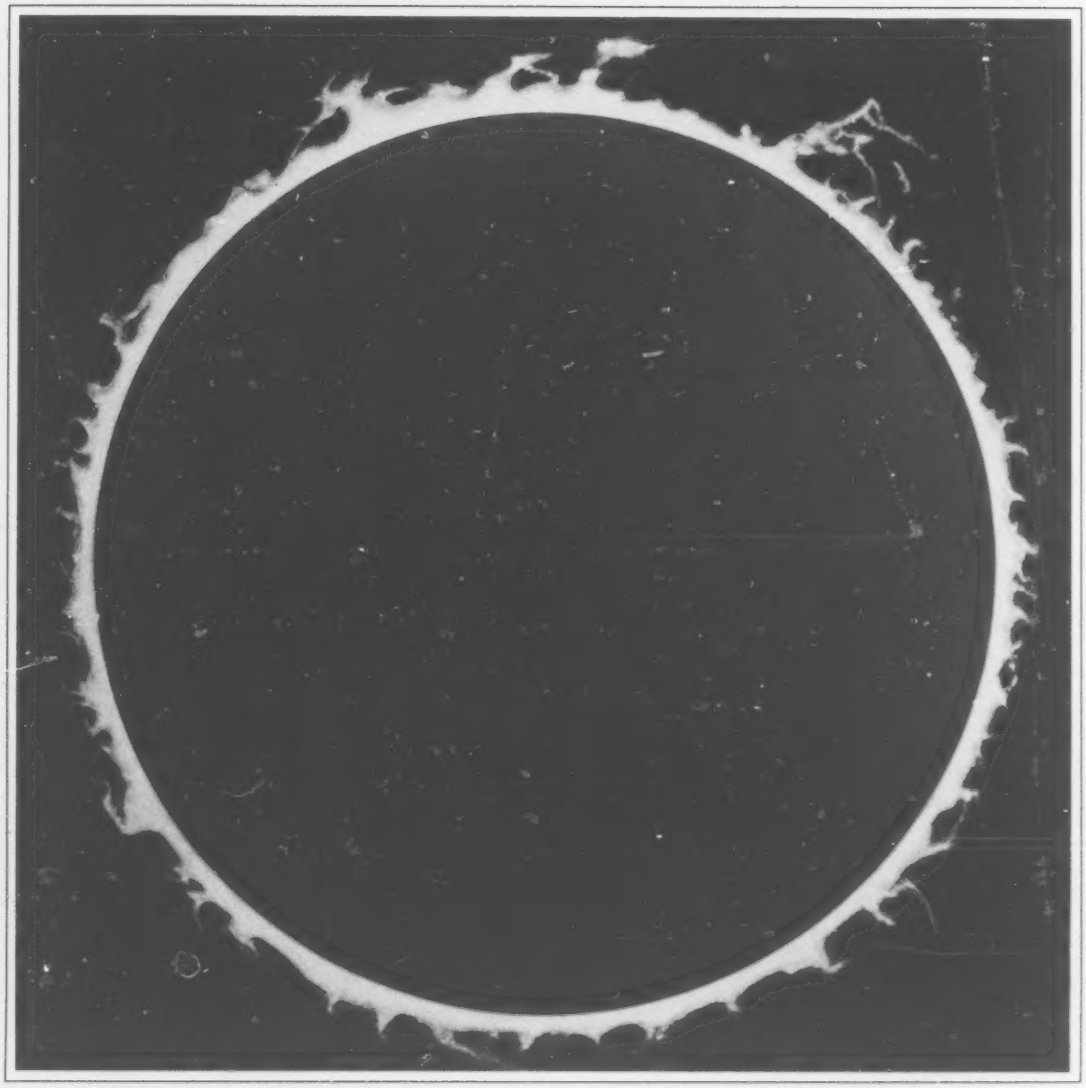
They will be able to do things nobody could possibly imagine—unless one happens to be a science-fiction author. ■

DEUTSCHE ZUSAMMENFASSUNG

13.000 "intelligente"Roboter gibt es bisher auf der Welt, je zu einem Drittel in Europa, USA und Japan. Man darf sie nicht mit ihren primitiven, nur um drei Achsen beweglichen Verwandten verwechseln, die automatisch bloss bestimmte einfache, immer gleichbleibende Vorgaenge, wie Aufheben und Hinstellen, ausfuehren koennen. "Intelligente" Roboter koennen viel mehr und stehen erst am Anfang einer glaenzenden, sehr vielversprechenden, aber auch sehr teuren Zukunft. Sie koennen schweissen und farbspruehen, metallgiessen und galvanisieren, fraesen und schmieden und auch montieren. Mit Arbeitsarmen von ganz erstaunlicher Beweglichkeit, die sich in grossem Radius bewegen koennen, und einer Steuerung ueber mikroelementbestueckte Elektronengehirne, fuehren diese eisernen Handwerksleute heute zumeist Schweissarbeiten in der Autoindustrie mit unnachahmlicher Praezision und Ausdauer durch. Auf zehn Jahre wird ihre Lebenserwartung kalkuliert, bei zwei vollen Arbeitsschichten am Karosseriemontageband pro Tag. Angesichts des heutigen Preises von ca. 250.000 DM fuer solch einen Robot-Kollegen bei der Augsburger Firma Kuka, darf hier mit einem merklichen Produktivitaetsplus fuer den Arbeitgeber kalkuliert werden, der diese Wunderapparate bei sich einsetzen kann. Und die Entwicklung der "intelligenten" Roboter geht weiter. Die naechsten Schritte sind Sehen und Tasten. Ueber Sensoren, wie sie schon heute in Kraftfahrzeugen zur Kontrolle von Treibstoffverbrauch und Abgasluft in Gebrauch sind, soll das angestrebte, ehrgeizige Ziel erreicht werden.

Dennoch, ein Roboter sieht nur im Film und in der Spielattrappe wie ein Mensch aus, der mit kleinen Schritten mehr faehrt als geht, mit der Stimme eines kleinen Transistorradios spricht und dessen Hirn in einer Kopfattrappe untergebracht ist. In Wirklichkeit ist ein Roboter eine hochtechnisierte Maschine, deren "Hirn," die Computereinheit, trotz Mikroprozessorentechnik, nahezu genauso gross ist wie ein Mensch und oft groesser, als der superleistungsfaehige mechanische Arbeitsteil, der im Fall der Augsburger Roboter von einem Tragerahmen herabhaengt, um groessere Bewegungsfreiheit des eisernen Schweissers und Monteurs zu erlauben.

Die Robotertechnik ist von entscheidender Bedeutung fuer den Produktivitaetsfortschritt der industrialisierten Welt und fuer die Wettbewerbsfaehigkeit innerhalb dieser Welt. Eine neue technische Revolution hat begonnen.



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Technological Progress: Its Impact Upon the Economy and Labor Market

by Mackintosh Consultants Company Ltd./Prognos Ltd.

(EDITOR'S NOTE: The government of the Federal Republic of Germany asked Prognos Ltd., Basle to investigate, jointly with Mackintosh Consultants Co. Ltd., Luton, England the impact of technological progress upon the economy, labor market and social policy in the Federal Republic of Germany by the year 1990.

The study was to concentrate on the following issues:

- What impact will the coming technological changes have upon the number of jobs available and upon qualitative manpower requirements?
- Will these technological changes bring about industrial unrest, or will manufacturing and institutional organizations be able to absorb their impact, given the support of their professional bodies.
- How will technological changes alter the structure of industries, their willingness to innovate and the demands which they will make upon the educational system for skilled personnel?

The study has evaluated three basic factors which have a major influence upon the rate of application of new technology to the sectors of the economy: (1) The state of development and the applications potential of the most important technologies; (2) The changing pressure on industry to innovate, brought about by changing economic circumstances; and (3) The influence of social, organizational and educational factors on decisions to innovate.

The conclusions of the study built upon an evaluation of the possibility, the acceptance and result of the implementation of technological change in each of the separate sectors of the economy. Only by this means has it been possible to take full account of the influence of the above factors upon the major industrial and institutional sectors in the Federal Republic of Germany.)

"The future development of jobs in different sectors of economic activity will be strongly influenced by major technological developments."

The future development of jobs in different sectors of economic activity will be strongly influenced by major technological developments. Among them will be

(1). Techniques affecting organizational structure and communications such as information systems, particularly a trend towards the increasing transfer of

information over long distances, e.g., via satellites and fiber optics-based communication systems; and techniques affecting office work and organization, particularly a trend to changes in organization and data handling, e.g., through the use of word processing equipment and facilities, computer-aided design, interactive computer systems.

(2) Automation techniques, permitting the operation, control and supervision of manufacturing processes by artificial intelligence and automation, e.g., more highly automated production systems, the use of robotics, new methods for testing and quality control, developments in transport and storage technology.

(3) Process industry and specialized production techniques bringing about technological changes in production processes. These will include new methods in the production, use and saving of energy; and various technologies concerned with industrial processes, such as the treatment of materials by lasers, continuous casting, specialized maintenance machines, etc.

(4) Technological changes affecting materials and semiproducts, e.g., the integration of separate elements into more complex prefabricated parts and the use of electronic components, and materials substitution.

"It is an over-simplification to assume that the influence of technological change on the development of the economy, including the impact of microelectronics, is by definition of a revolutionary kind."

Where innovation has been effected, it has often shown a high interdependence with singular technical developments. In many cases it was only the appropriate combination used for solving a special problem for a company or a sector of economic activity that led to a successful diffusion.

Technological change impacts economic development in a variety of ways. These may occur by means of altered production processes, aimed at the reduction of processing costs; by alterations of the inputs to industry, resulting in a need for new methods of handling and manufacturing aimed at quality improvements or a saving in material costs; and by alterations to products (including improved and completely new products), aimed at the consolidation of traditional markets or the creation of new ones.

"...inertia of technical, economic and social systems themselves can act to prevent a dramatic breakthrough by new technologies."

Within particular sectors of economic activity, these influences result in a change of productive capacity, viz. the volume of goods and services that can be produced, and/or productivity, viz. the demand for labor (in general, or specifically for certain types of qualification). Taken together, these factors determine employment levels and qualitative manpower requirements in the labor force.

The impact of new technologies upon employment cannot be viewed in isolation. Other factors can reinforce or weaken their influence. The effectiveness of increases in productivity which can arise from new technologies is modified by different utilization rates of production plants, changing organization of work processes, changes in product mix and improved work performance using traditional production methods, due to the "learning by doing" effect. Moreover, innovative products based upon new technologies will only succeed if they follow the general trends in demand, and are matched to the specific needs of consumers (households, corporate enterprises and public authorities).

It is an over-simplification to assume that the influence of technological change on the development of the economy, including the impact of microelectronics, is by definition of a revolutionary kind. The application of particular developments, especially those of microelectronics, to the different sectors of economic activity demands substantial innovation and development in other fields of engineering. In addition, delays can take place in the introduction of innovations which are technologically feasible today, through lack of industrial and organizational experience in adapting to change. Finally, the inertia of technical, economic and social systems themselves can act to prevent a dramatic breakthrough by new technologies.

The impact of evolutionary technological developments (as found particularly in automation within the areas of production and testing and in transport and the use of materials) will continue to influence

Economically Active Persons
by Type of Activity in the Federal Republic of Germany
1977 to 1990

Field of activity	Economically active persons		Change compared to 1977		Econ. Active persons: percent of total	
	1977	1990	in 1,000	in %	1977	1990
1 Mainly management functions	922	1,104	182	19.7	3.7	4.4
2 Office work	3,863	3,611	- 252	- 6.5	15.5	14.4
3 Entertainment, Publishing	125	152	27	21.6	0.5	0.6
4 Education	897	1,076	179	20.0	3.6	4.3
5 Cleaning operations	872	1,002	130	14.9	3.5	4.0
6 Installation, repair and maintenance of machinery	2,224	2,695	471	21.2	8.9	10.8
7 Specialized consulting, research and development	1,171	1,604	433	37.0	4.7	6.4
8 General supply services	2,343	2,150	- 193	- 8.2	9.4	8.6
9 Special supply services	498	470	- 28	-5.6	2.0	1.9
10 Assemblers and Assistants	2,467	2,144	- 323	-13.1	9.9	8.6
11 Rail transport	199	165	- 34	- 17.1	0.8	0.7
12 Road and sea transport	748	797	49	6.6	3.0	3.2
13 Operating processing plants	1,396	1,000	- 396	28.4	5.6	4.0
14 Special tasks in manufacture of metal products	780	801	21	2.7	3.1	3.2
15 Special tasks in construction	1,371	1,095	- 276	-20.1	5.5	4.4
16 Special tasks in food, beverages, tobacco	501	531	30	6.0	2.0	2.1
17 Special tasks in agriculture	1,610	1,372	- 238	- 14.8	6.5	5.5
18 Special tasks in mining	151	132	- 19	-12.6	0.6	0.5
19 Special tasks in manuf. of clothing	200	200	±0	±0	0.8	0.8
20 Special tasks in printing	151	104	- 47	- 31.1	0.6	0.4
21 Transmission of information	176	157	- 19	- 10.8	0.7	0.6
22 Health Services	727	917	190	26.1	2.9	3.7
23 Legal advice, business consultancy	126	158	32	25.4	0.5	0.6
24 Security functions	927	1,120	193	20.8	3.7	4.5
25 Test, measurement, g.c.	376	371	- 5	- 1.3	1.5	1.5
26 Others	100	64	—	—	0.4	0.3
Total	**24,921**	**24,992**	**71**	**0.3**	**100**	**100**

Source: Prognos/Mackintosh

economic development at a pace not dissimilar to that in the past. In contrast, developments in the field of organization and communications, energy and in robotics technology will exert an increasing influence over the period to 1990.

The most important influence of technology is expected in those sectors of economic activity (a) where production is coming to be dominated by *information processing*, as in printing, wholesale and retail distribution, communications, banking and insurance, office computing and accounting machinery. In these sectors developments in organization and communication technology will bring about major changes in production and labor requirements; (b) where production processes still make use of functions suitable for further automation, as in sectors of the chemical industry, the production of plastic products, the manufacture of pottery, china and earthenware, glass and glass products and the manufacture of wood and paper products and textiles. In these industries improved methods of automation and production will progressively reduce the demand for labor. As a consequence employment in the manufacture of machinery will benefit from the resulting increases in demand for automation equipment; and (c) where products are still assembled from many single pieces or where continuous minding of production processes is needed, as in mechanical engineering, the manufacture of motor vehicles, electrical engineering, the manufacture of precision instruments and construction and communications; these branches are being impacted by new methods of production control and assembly and by the integration of separate components into fewer, more

"Both the volume of business available to the private sector and the tasks facing labor and employer associations are changing due to significant shifts in the community's needs and demands."

complex prefabricated parts.

The general economic framework

In the period since 1970 changing economic factors have had a major influence upon the rate and level of implementation of new technology in the domestic, manufacturing and public sectors of the economy. Both the volume of business available to the private sector, and the tasks facing labor and employer associations are changing due to significant shifts in the community's needs and demands:

- A declining population and a static number of private households is reducing the growth of consumer expenditure and eliminating the need for an expanding infrastructure (e.g., in housing, education, health, administration).
- The high level of wealth already attained in the private and public sectors is reducing the demand for durable consumer goods and the investment in plant and equipment to the level of replacement needs, or causes a movement to products of higher quality.
- The quest for increasing quality of goods and services, which is arising from all groups of purchasers, is leading to greater diversity of demand.

Most enterprises are finding that the level of competition in both the national and international markets has grown substantially. Several factors are responsible:

- Shifts in domestic demand are making sales of mass-produced products more difficult and there is a clear trend to a buyer's rather than a seller's market; enterprises can only survive if they can convince their customers of the high quality of their products, or offer significantly better terms of delivery.
- Similar trends apply to export markets; there, sales possibilities are less limited by the level of demand than by the increasing pressure of foreign competitors, the opportunities being impacted by the appreciation of the German currency; growing production capacities in industrialized and developing countries, especially for mass-produced goods; increasing influence of countries exporting raw materials, especially crude oil, on international trade relations; and the increasing readiness of nations, including the advanced Western nations, to protect their domestic economies and to promote research and the restructuring of their industries.
- Increasing costs of domestic production, due to the Federal Republic's heavy dependence on imported raw materials and energy; high standards of living and corresponding wage levels; and increasing legal requirements to ensure that living conditions are of a high standard in the densely populated Federal Republic of Germany.

The trends valid for the traditional markets are partly supplemented, partly reinforced, by newly arising markets. Increasing leisure time and disposable income give rise to increasing demands for leisure goods and for services concerned with information, education, health and welfare. The scarcity of raw materials and energy and a growing consciousness of dangers to the environment promise good markets for the sale of equipment and installations that save energy and raw materials and preserve the environment.

The improvement of living and working environments is increasingly recognized as the key to much social progress. Hence, opportunities are to be found in health care, various services and products, and in improved dwellings and production plants. Capital investment and rationalization of production to reduce labor intensiveness brings with it the danger of underutilized capacity and consequent high capital costs. Exceptional opportunities will exist for consumer durables having high added value and production plants with a capability for a flexible product mix.

The quality and volume of community information is of growing importance within enterprises, schools, administrations and in politics, due to the increasing level of labor specialization; there are, therefore, expanding markets for professional services (management consultancy, organization planning, etc.) and related products (e.g., audiovision).

National technological capability, made up of technology and an understanding of the mechanisms of its transfer, together with the receptivity of managements and workers to learn about and agree upon technological innovation, has become a crucial factor in international competition. In this context, the numerous regulations imposed by

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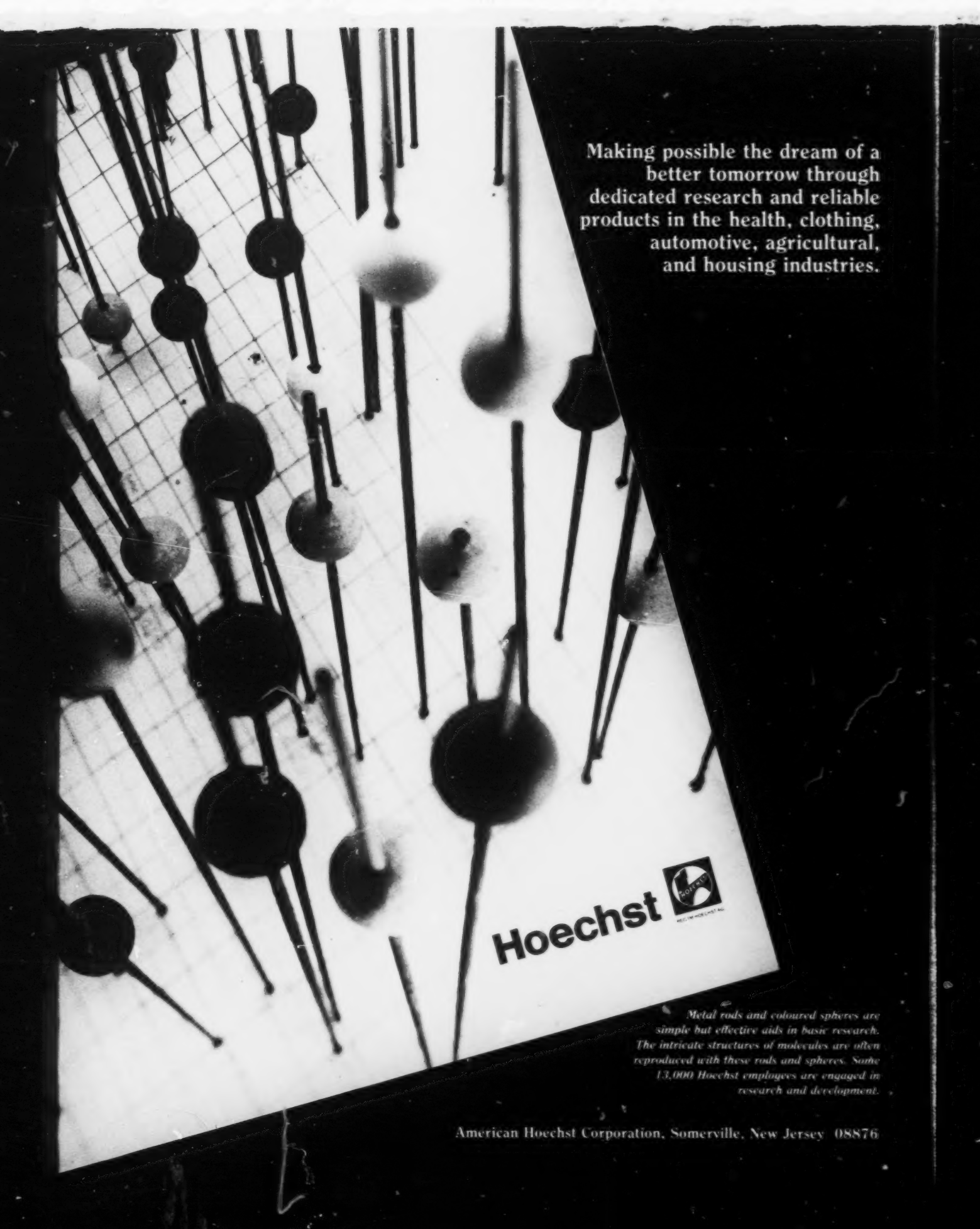
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legislation in the fields of environmental protection, safety, health and consumer policy are of special importance. Although these regulations often increase costs, they also encourage the development of new technical solutions which can open up potential new international markets, especially in the medium and longer term (e.g., in mechanical and electrical engineering and the manufacture of precision instruments).

Changing economic conditions dictate that the need for innovation in manufacturing methods is very great. Here, domestic and foreign developments reinforce each other. The rapid application of new products and process innovation is the only way to gain access to new, and to consolidate traditional markets, and to cut costs or reduce the impact of inflation on input prices. Particularly vulnerable industries are: the chemical industry and petroleum refineries; the manufacture of rubber and plastic products; the basic metals industry; mechanical engineering; the manufacture of office, computing and accounting machinery and the manufacture of motor vehicles; the manufacture of precision instruments, musical instruments, sporting and athletic goods and toys; and the manufacture of leather goods and clothing.

"Exceptional opportunities will exist for consumer durables having high added value and production plants with a capability for a flexible product mix."

Society and technological change

To date, there have been very few scientific investigations assessing the influence of social, organizational and educational conditions upon the development and application of technology. In consequence, this study can only provide a preliminary assessment of their future influence.

Three possible trends can be identified with respect to technology-related organizational problems. The increasing complexity and interdependence of the processes of decision-making favor a centralization of power, decision-making and control of the economy in both the private and the public sectors. The tendency towards increasing bureaucracy in organizations practising centralized decision-taking and control leads to decreasing efficiency and calls for a decentralization of managerial responsiblility within each hierarchical structure, thus increasing the scope for decision contributions down to the individual employee. Finally, increasing use of technology, manpower specialization, subdivision of labor and decentralization of responsibility will give rise to an increase in uncoordinated situations, bringing with them potential industrial conflicts.

The operational competence and stability of individual organizations, including the overall social system, depends more and more on self-regulating systems that are capable of dealing with conflicts as they arise in a co-operative and innovative manner.

Growing specialization in industrial undertakings and in the jobs that people do are increasing society's demands upon the educational system. This is made clear by the ongoing discussion about desirable changes to the educational system in the FRG. Current education in the FRG aims to equip students with a high level of specialist knowledge. Yet entrepreneurs and employers in general need employees who can be used in a flexible way, who are willing to learn, ready to co-operate and able to rapidly acquire new skills and special knowledge.

Employees with high professional qualifications have an increasing influence on the innovation process. They will reach management positions in all areas where important decisions depend on their professional knowledge or where they supervise the performance of important subsystems (e.g., entire assembly lines or computer systems). By virtue of their education, innate abililties and work experience, they will be in a position to identify and make known potential threats, both to their position and to that of the organization (and the society) in which they work. Thus they can have an important impact upon industrial progress, not only through their professional and political affiliations, but also directly upon the organization for which they work.

By the quality of their education and the degree and direction of their personal and political motivation, these groups of employees determine more and more the readiness of an enterprise to innovate. At the same time, their voting patterns allow them to have a general influence on the choice between political alternatives.

"Looking to the future, an analysis of the need for change and the degree of freedom to implement it reveals the possibility that in several industries the social climate is likely to deteriorate."

Economically Active Persons:
Changes in Employment Needs between 1977, 1985 and 1990
in the Federal Republic of Germany (millions)

	Changes in demand		Changes in Employment needs	
	1977-85	1985-90	1977-85	1985-90
1. Change in job opportunities				
• Agriculture	-	-	0.18	0.06
• Manufacturing, energy, gas, water and construction	0.36	0.35	0.60	0.29
• Other services offered by industries and private persons	0.28	0.19	0.21	0.12
• Public authorities, nonprofit organizations, transport and communication	0.31	0.27	0.13	0.05
2. Change in labor force potential	-	-	0.91	-0.47
3. Unemployment				
• Frictional unemployment at end of period, with full employment (registered)	0.40	0.40	-	-
• Unemployed at start of period	-	-1.91	3.01	
comprising: registered unemployed	-	-	1.03	1.66
not registered unemployed	-	-	0.88	1.35
• Unemployed at end of period, excluding frictional unemployment	2.61	1.85	-	-
comprising: registered unemployed	1.26	0.84	-	-
not registered unemployed	1.35	1.01	-	-
TOTAL	3.94	3.06	3.94	3.06

Source: Prognos/Mackintosh

The ability of the social system to cope with the changes arising from technological innovation, and from structural change in the economy, depends on the relationship between the magnitude of the need for adaptation (pressures) and the social degree of freedom to adapt (by a process of self-regulation).

The problems of adaptation to change in a sector of economic activity are higher the greater the technological feasibility and economic necessity for reshaping existing practices (innovative pressure); the greater the attendant need for retraining and new work experience; and the greater the associated fall in influence of groups of employees that previously played an important role, both within their enterprises and in related external organizations.

On the other hand, the ability of an organization to absorb changes without disruption is greater the lower the level of concentration of jobs at a regional and company level; the greater the level of corporate identity (which decreases with increasing size of the enterprise and increasing complexity in the hierarchy of its organizational structure); and the more evenly the bargaining power is balanced between all the groups involved, both inside and outside the enterprise.

In the past, West Germany has had a favorable relationship between the need for change and the degree of freedom to implement change for the following reasons:

- until 1973 the need for structural change was accompanied by national "over-employment" and a falling reservoir in the domestic labor force;
- the levels of skill were such that the work force was very interested in adaptation and learning;
- many potential social conflicts, including those arising from the negotiation of wage agreements, could be solved in a co-operative way;
- both management and employees demonstrated a relatively high readiness to innovate.

Looking to the future, an analysis of the need for change and the degree of freedom to implement it reveals the possibility that in several industries the social climate is likely to deteriorate. Specifically, in industries where the social and organizational pressures arising from innovation are likely to overtax the established negotiating mechanisms such as chemicals, the manufacture of rubber and plastic products, printing, publishing and allied industries, and textiles. On the other hand, the existing industrial organizations appear to be

adequate to cope with an accelerated rate of change in electricity, gas and water, foundries, mechanical engineering, electrical engineering, the manufacture of transport equipment, the manufacture of precision equipment, and banking.

The need to adjust to change has significantly increased since 1970 and will continue to increase in the future. Therefore, an increasing organizational ability to adapt, i.e., a greater willingness to negotiate to achieve a settlement that meets the interests of all parties concerned, will be of increasing importance. This requires an extensive social learning process within corporate enterprises which must embrace not only the work force and those engaged in collective bargaining, but also the political parties and their membership. The need for this social learning process is only now coming to be gradually accepted; few new solutions based on a broad consensus are as yet in sight. ■

DEUTSCHE ZUSAMMENFASSUNG

Technologische Veraenderungen koennen die wirtschaftliche Entwicklung auf sehr verschiedene Weise beeinflussen. Sie koennen ihren Niederschlag in neuen Herstellungsverfahren finden, die eine Senkung der Verarbeitungskosten zum Ziel haben, sie koennen zur Neudefinition der Vorgaben an die Industrie fuehren und damit neue Konstruktions-und Bearbeitungsverfahren notwendig machen, die Qualitaetsverbesserungen und Einsparungen bei den Materialkosten bezwecken; und sie koennen schliesslich Aenderungen an den Produkten selbst initiieren—ueber die Verbesserung bis hin zur voelligen Neuentwicklung von Produkten—, um damit die Konsolidierung vorhandener Maerkte oder die Schaffung und Eroeffnung neuer Maerkte zu ermoeglichen.

Die Auswirkungen der technologischen Evolution, wie sie besonders im Bereich der Automation von Produktions—und Testverfahren, im Transportwesen und beim Materialeinsatz, heute schon unuebersehbar sind, werden die wirtschaftlichen Entwicklungen auch weiterhin in unveraendert raschem Tempo stimulieren. Dazu werden bis 1990 zunehmend die Neuerungen spuerbar und wirksam werden, die sich auf den Gebieten der Organisation und Kommunikation, der Energie und bei der Robotertechnik angebahnt haben. Die Nachfrage auf bestehenden Maerkten wird durch neu hinzukommende Maerkte zum Teil mit ergaenzt und auch verstaerkt. Immer mehr Freizeit und verfueghares Einkommen werden den Bedarf an Freizeitartikeln und Dienstleistungen erhoehen, insbesondere auf den Sektoren Information und Bildung, Gesundheit und Wohlfahrt. Die Verknappung von Rohstoffen und Energie, sowie das zunehmende Umweltbewusstsein, versprechen gute Maerkte fuer Ausruestungen zur Einsparung eben dieser knapp gewordenen Wirtschaftsgueter.

Die technischen Faehigkeiten einer Nation, die in technischem Wissen bestehen und im Verstaendnis fuer seine Mechanismen und seine Weitergabe, gepaart mit der Bereitschaft von Unternehmensleitungen und Arbeitnehmern,technische Neverungen zu foerdern und anzunehmen sind zu einem entscheidenden Faktor im internationalen Wettbewerb geworden. In diesem Zusammenhang kommt den vielen gesetzlichen Bestimmungen im Bereich des Umweltschutzes, der Betriebssicherheit, des Gesundheitswesens und der Verbraucherpolitik ganz besondere Bedeutung zu. Denn diese Bestimmungen, die zu spuerbaren Kostensteigerungen fuehren koennen, machen haeufig die Entwicklung technischer Neuloesungen wirtschaftlich, die ihrerseits neue internationale Maerkte finden koennen, insbesondere aus mittel- und langfristiger Sicht. Zu nennen sind hier besonders die Bereiche von Mechanik und Elektrik, sowie die Herstellung von Praezisionsinstrumenten.

Der Druck auf Unternehmer und Beschaeftigte und auf die Gesellschaft als Ganzes, zur Anpassung an die vor sich gehenden technologisch bedingten Veraenderungen, hat sich seit 1970 staendig erhoeht und wird kuenftig noch hoeher werden. Aus diesem Grund wird eine wachsende Faehigkeit zur Organisation des Anpassungsprozesses, zur Schaffung der noetigen Gespraechsbereitschaft bei den Sozialpartnern mit dem Ziel, allseits befriedigende und gerechte Loesungen zu finden, von immer groesserer Bedeutung. Das setzt einen breiten sozialen Lernprozess im Unternehmensbereich voraus, an dem nicht nur die Belegschaften und ihre Verhandlungsfuehrer teilhaben muessen, sondern auch die politischen Parteien und ihre einzelnen Mitglieder. Das Verstaendnis fuer die Notwendigkeit eines solchen sozialen Lernprozesses steckt noch in seinen Anfaengen; bisher sind erst wenige Vereinbarungen und Abkommen erkennbar, die den sozialen Notwendigketten gerecht werden, die sich infolge der technischen Evolution aufgetan haben.

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Modern Banking in the finest Royal Tradition

Germany and the Changing Scene of Information Needs, Information Technology, Information Management

by Dr. Gerhard Adler
General Manager,
Diebold Deutschland GmbH

Germany like all industrialized nations, or maybe more than any of them, experiences the changing environment—the loss of old-time markets, the pressure of permanently increasing costs with no growth of income, the high price of energy.

Whatever is done to meet this challenge obviously calls for more information, for faster and more sophisticated information handling and communication.

The possible solution, to grow in quality and not in quantities, means that we must not simply count, but have to construct a detailed description with a very high degree of resolution. Seeking new market niches will mean shorter product cycles and greater product variety. This calls for shorter development, up-to-date changes, flexible manufacturing—and more and quicker information handling. Assuring delivery, maintenance and spare parts supply in a highly competitive, highly segmented marketplace can only be done by advanced logistics, which means more and faster information. Acquiring raw materials and product components and selling goods and services results in a meshed network of international and national business relationships feeding the need for communications.

Changing user needs

There are three areas of change of user needs. The *first* is represented by figure 1. Market success and profits depend on decision making. Hence, providing the professionals and managers with the supporting information becomes the main goal. There is the shift to ad hoc, unstructured and outside, extra-company information, which also means that a change is necessary in information presentation from data and text toward graphics, speech, and images.

The *second* change starts with the switch from batch to dialogue, in its consequence leading to individualized integrated working processes. Nobody will be able to tolerate

CHANGING USER NEEDS

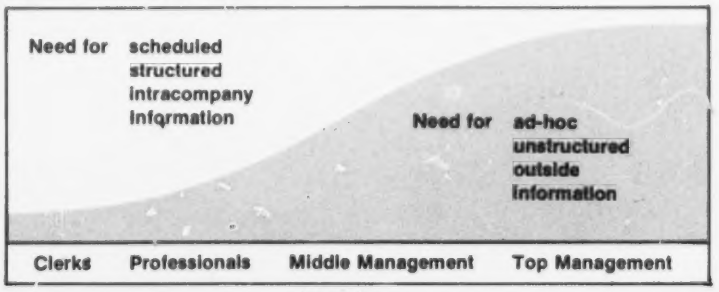


Figure 1

computer center turnaround times and technology-induced interruptions in the decision-making process. The need to integrate data, textual and speech communications comes out of the same source.

The *third* change means integration. Integration and consolidation is an old slogan in administrative and management information systems. There integration has been on the way for more than a decade. Now, new areas are calling for integration: The techno-scientific, manufacturing field with all its happy islands of engineering computations, numerical control of manufacturing processes, warehouse control systems is merged together into integrated CAD/CAM systems. There is a long way to go, with most of the problems not yet solved.

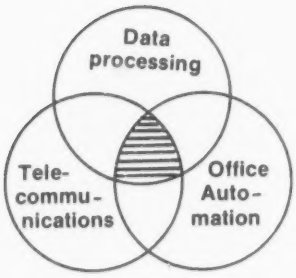


Figure 2

Changing technology structures

The merging of technologies, as shown in Figure 2, of computers, telecommunications and office automation is no news any more. Where only two technologies overlap, the result still could be sorted in readily. Data processing and telecommunication led to data-teleprocessing.

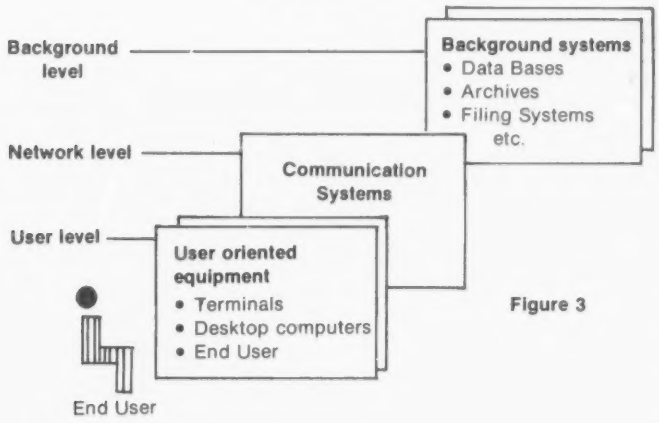


Figure 3

Data processing and office equipment linked together resulted in the new field of word processing. But there is the grey area in the middle, where all technologies unite. The old product and market classifications do not work any more in this area. New structures and classifications are needed. A new structure is evolving, as shown in Figure 3.

- User-oriented equipment
- Communication systems
- Background systems

The "universal"computer in the midst, able to do almost everything, will be replaced by specialized background systems, for instance, data base systems on the corporate or even public level.

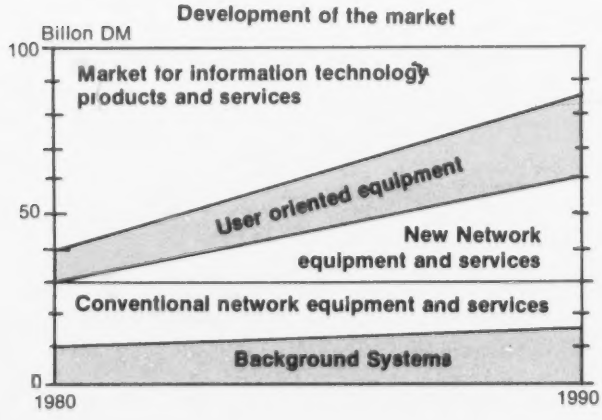
In the long term, the communications system will take up the central role, integrating all forms of information representations—data, text, speech and images. By setting the interface and communications standards—necessary beyond doubt—communications systems providers will have a not yet fully perceived influence on the information systems market as a whole.

The center of innovation and growth in the immediate future, however, will be the user-oriented equipment. There, a new type of modular universality will take place, giving the end-user complete support functions for his type of work—secretarial, professional, managerial.

Development of the market

Presently, in the Federal Republic of Germany there is a market of more than DM 40 billion for information technology products and services. About half of this is spent for equipment, the other half for services, with postal, telephone and telegraph telecommunications services eating up most of this.

The background systems market will be growing only slowly, with more and more functions moving into end-user-oriented equipment. Vendors having a major entry in the telecommunications market and access to computer technology are best equipped for the future: Siemens, IBM, ITT and a few others still seeking their configuration to



"Presently, in the Federal Republic of Germany there is a market of more than DM 40 billion for information technology products and services."

"The old structure—organization, programming, computer center, with office organization and telecommunications being done somewhere in the company—will not do any more."

attack the market—Philips, AEG-Telefunken/Bosch/T&N. For manufacturers of end-user-oriented equipment, provided they also grasp the "right" communication-standards, the market is wide open. Here is a wide field for specialists, but also for the Japanese.

As the market narrows for background systems, and huge software investments to be earned, only very few systems vendors and some more PCMs (Plug Com.atible Manufacturers) will stay in the marketplace.

Changing ADP organizations

There is a dramatically rising importance of information and communications systems for the business market. It is necessary to grasp progress ahead of the competition, in fields not being the home base of automatic data processing organizations like telecommunications and office automation.

The workload for developing information systems is increasing. Some ADP departments already have an order backlog of more than two years.

So, many chances to increase efficiency and to provide better and quicker information for decision-making cannot be taken, simply because there is no qualified manpower to develop the systems necessary.

ADP organizations in almost all companies are under fire because they cannot provide the overall service to the user as was their goal in the past. Therefore, solutions to this problem are sought frantically. With the new structures in technology new organization structures for systems development and operations are required. The old structure—organization, programming, computer center, with office organization and telecommunications being done somewhere in the company—will not do any more.

There is only one solution to cope with the workload: to provide end-users, clerks, professionals, managers, with an information infrastructure—user-oriented equipment, data base access, query languages—which will enable them to fill their ad hoc information needs themselves.

So, today, change is becoming the rule. There are many uncertainties concerning the technology and the organizational concepts of the near future. But to wait until everything is settled, would mean to deliberately give up tomorrow's business opportunities. ■

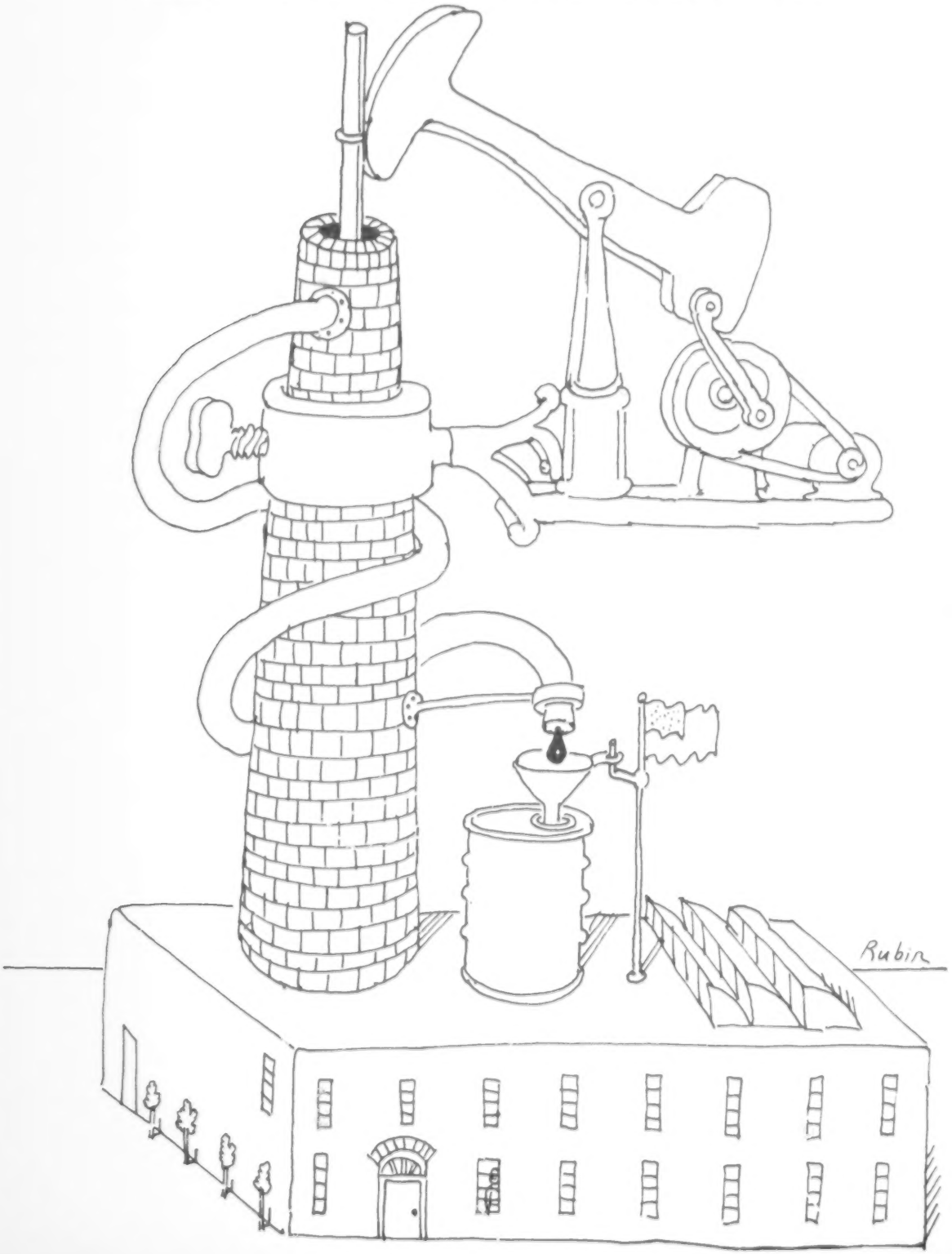
DEUTSCHE ZUSAMMENFASSUNG

Alle Loesungen, mit dem Wandel unserer Welt fertig zu werden, qualitatives statt quantitatives Wachstum, Erschliessung neuer Maerkte, Vergroessern der Produktvielfalt, Senkung von Kosten und Energiebedarf, haben eines gemein: sie verlangen mehr, bessere und schnellere Informationen.

Die veraenderten Beduerfnisse der Benuetzer und die Entwicklung der Technologie mit ihrer Verzahnung von Computertechnik, Nachrichten=und Buerotechnik verlangen eine neue Ordung der Technologie, neue Strukturen im Markt und in den Organisationen. Gegenwaertig entwickelt sich eine Neugliederung des Produkt—und Dienstleistungsangebotes: Benuetzernahe Geraete, Telekommunikationssysteme, Hintergrunddienste (wie z.B. Datenbanken, Archive, Zentraldruckereien). Entsprechend bilden sich neue Marktsegmente heraus, mit unterschiedlichen Potentialen und Charakteristiken. Die Unternehmen sind vor die Frage gestellt, mit welcher Strategie und Organisation sie das Nutzenpotential aus Einsatz der Informationstechnologie ausschoepfen koennen.

Das Feld der Informationstechnologie und des Informationsmanagements ist ein Feld voller Chancen und Risiken. Viele Wege werden sich als Irrungen herausstellen. Eines ist jedoch mit Sicherheit falsch: Warten bis alles eindeutig und klar ist.

Imagine a smokestack that turns heat into oil.



We did. Now it's a reality.

You can't blame a guy for being concerned when he sees a lot of wasted energy going up a factory smokestack. Especially when he's riding in a carpool, doing his bit to conserve energy. Fortunately, though, the man is a Garrett engineer. And the sight of that smokestack is enough to start him thinking about putting all that untapped heat to work.

A heat exchanger is designed and implemented to fit inside the stack of a furnace. It works like this: Gases rising through the stack (up to 1500° F) are used to deliver "free" preheated air to the burner. The result is 25% less fuel oil required to heat the furnace. Depending on how you look at it, that's quite an energy discovery. It's one reason why, when it comes to making engines and systems more efficient, more companies are turning to Garrett.

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If you're wondering how we can make your enterprise work harder, write our President, Jack Teske, for more information. You'll find him at The Garrett Corporation, Dept. 1, P.O. Box 92248, Los Angeles, California 90009. Or drop by. But please, remember the heat America loses. And on your way out, don't forget to close the door.

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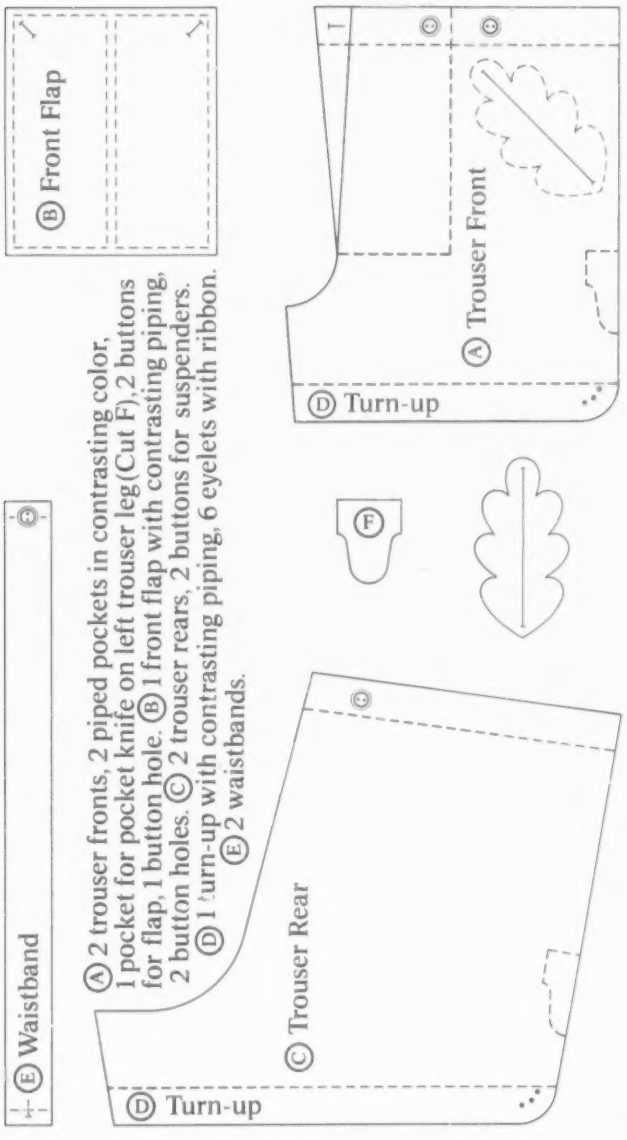
How to sew a Lederhose.



Ⓐ 2 trouser fronts, 2 piped pockets in contrasting color, 1 pocket for pocket knife on left trouser leg (Cut F), 2 buttons for flap, 1 button hole. Ⓑ 1 front flap with contrasting piping, 2 button holes. Ⓒ 2 trouser rears, 2 buttons for suspenders. Ⓓ 1 turn-up with contrasting piping, 6 eyelets with ribbon. Ⓔ 2 waistbands.

Until 1800, these leather shorts were virtually unheard of. And many a year went by before Lederhosen became the Bavarian national costume. From time to time they were even considered indecent.

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The Market for Telecommunications: A European View

by Dr. Ing. Hans Baur
Director,
Siemens AG

It is only natural that telecommunications should stir up so much interest within public discussion, for the economic growth of a nation depends on the development of its telecommunications. The World Bank has emphasized this concept as follows: "If trade is the lifeblood of an economy, then telecommunications can truly be regarded as the nervous system of both the economy and the society."

We in the highly industrialized countries tend to forget this fundamental truth, spoilt with telecommunications systems that function excellently by world standards. But whoever has occasion to work or travel abroad will frequently experience, with delight or perhaps frustrations, the importance of a well functioning telecommunications system.

In addition to this purely emotional evaluation of the importance of telecommunications, statistics show that the telephone density of a nation increases in proportion to the per capita gross national product. In other words, economic development is not possible without a telecommunication system, and vice versa.

A further important consideration when assessing the importance of telecommunications, especially in the future, is that our knowledge and information resources have increased dramatically in recent years. How will we make use of these resources at an acceptable cost in terms of time and effort? The answer is: by data processing and remote access through telecommunications.

Fig. 1 (right side) shows how man's knowledge and information resources have increased in recent years. One can disagree about the value of the information—and indeed about which information should be made available to whom—but the fact

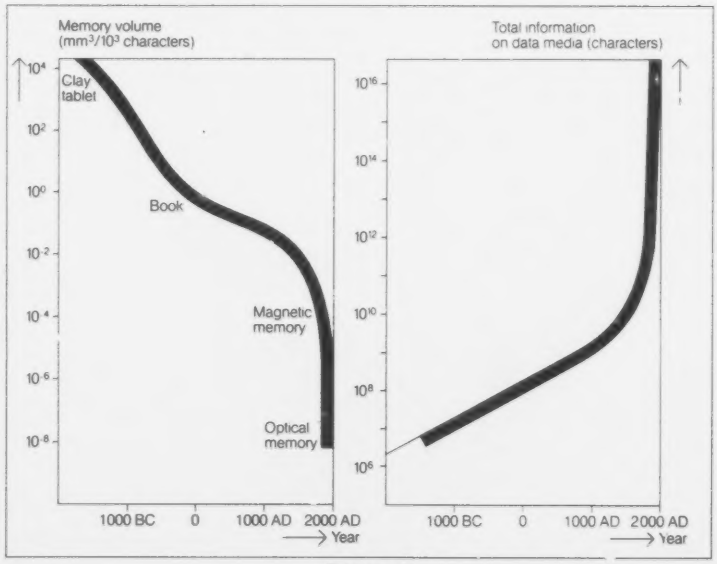


Figure 1

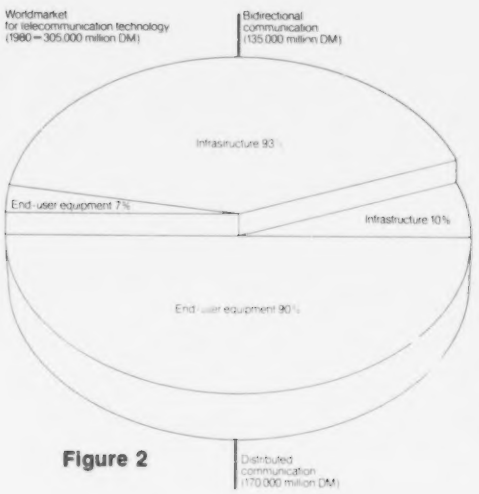


Figure 2

remains that it exists. Fig. 1 (left side) shows the development of information—storage media along with the increase in the volume they handle. Such media are essential for the remote accessing of information. These two diagrams illustrate that the development of remote accessing of all information is an urgent contemporary problem that must be solved.

Another reason why telecommunications receives so much attention today is the size of the telecommunications market which, ranging from radio and television to telephones, teleprinting and data traffic, amounts to nearly DM 300 billion per year (Fig. 2).

Furthermore, the telecommunications market is an innovative growth market, which means that its rate of growth exceeds that of the gross national product (Fig. 3). It thus compares to such markets as chemical products or electronic components.

Note again that Fig. 2, for the sake of convenience, divides the telecommunications market into two parts—the distributed communication market (a classical example being television), and the bidirectional telecommunication market (such as the telephone).

The telecommunications market, ranging from radio and television to telephones, teleprinting and data traffic, amounts to nearly DM 300 billion per year.

Distributed communication market

Distributed communication means that information is distributed from one or more centers as required for geographical, technical or political reasons. In most cases the medium is wireless transmission, most familiar from the two main areas of distributed communication: radio and television.

In this type of communication, the most common and simplest form of receiving equipment consists of the single antenna. Nowadays antenna amplifiers and community antenna systems are often used to improve reception in areas with poor conditions or to provide economic, adequate reception in apartment houses. The number of subscribers hooked up by cable to such a community system may range from just a few to tens of thousands. In Germany over 30% of all subscribers are already connected to community antenna systems.

Unfortunately the number of accessible wavelengths that can transmit information in Europe is very limited, and consequently the number of channels is very low: in Germany, three television channels and approximately five stereo radio channels (some using different frequencies from region to region). The allocation of these sparse resources is determined by the International Telecommunications Union (ITU), a special agency of the United Nations, in the so-called World Administration Radio Conference (WARC).

One of the few ways to increase the number of allocatable channels is to switch from wireless transmission to cable, such as with cable radio or television. Since the number of channels that can be allocated with this method is virtually unlimited, the introduction of cable television immediately becomes a subject of political debate. Would more than three channels be needed? Who should be in charge of these channels? Who should own the necessary distribution networks? These are just some of the political questions arising out of the widespread introduction of cable transmission.

Satellite TV provides another way of increasing the number of receivable channels, but requires special antennas. Here again the introduction of new technology will raise legal questions concerning who should be responsible for these channels.

In the meantime, experimental cable television networks with return channels

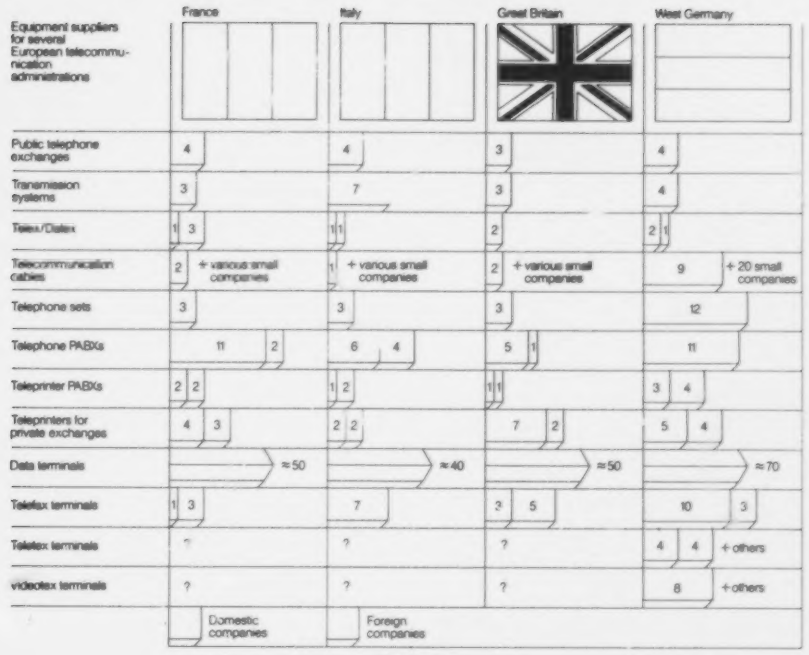


Figure 3

have been set up. Such channels do not allow full communication but they do allow a signal exchange in which it becomes possible, for example, to say if a program was liked or not, or to select a special program that must be paid for.

The products of concern as regards the creation of a distributed communication infrastructure are:

- the studios together with the necessary transmission equipment and antennas, and
- communication networks between studios for the exchange and recording of programs.

If satellite television is actually introduced, this list of products will have to be expanded to include the satellite transmitter and receiver as well as the satellite itself. The distributed-technology infrastructure also includes the network built up with or without a return channel when community antenna systems are established.

The remaining distributed communications products on the market include the subscriber's receiving equipment, including the single aerial. Here, receiving equipment means TV and radio receivers and all accompanying appliances such as record players, tape recorders, radio alarm clocks or video tape recorders.

End-user equipment dominates

As seen in Fig.2, the size of the distributed communication market is enormous. The main factor consists of end-user equipment, especially television sets (Fig. 4). The distributed communication market breaks down into four areas, each supplied by different manufacturing groups. Areas I and II, both very small, deal with the telecommunications infrastructure, that is transmitters and studio equipment, and they are supplied by well-known telecommunications firms. Area III concerns single and community antennas and is supplied by a series of small and medium-sized firms. Area IV, which consists of end-user equipment, has a large number of suppliers, and here Japan dominates the world market.

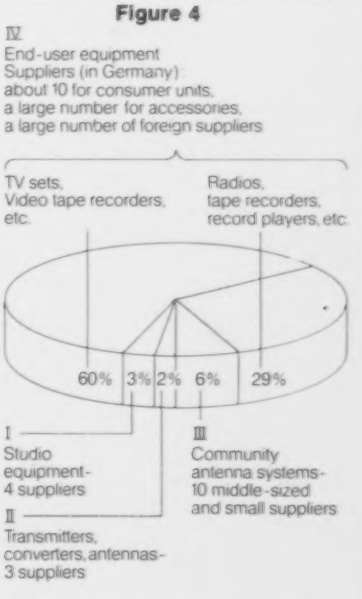
The main consideration for a firm when it decides whether or not to become involved in a market is whether that market is accessible, and if so, under what conditions. The behavior of the market proves essentially the same for the distributed communication infrastructure as for bidirectional communication.

For end-user equipment and cable-TV and -radio networks the markets are open, the only restriction being that customs duties differ between the individual markets, and providing that the CCITT conditions and the technical specifications of the individual postal authorities and operations companies are met.

While terminal equipment is marketed through retailers, infrastructure technology is sold directly to the postal authority or operations company, the few suppliers in this field supplying their goods in response to invitations to bid.

It is difficult to give the exact figures for growth rates in distributed communication

Figure 4



since the market sector on which it so heavily depends, namely end-user equipment, is very sensitive to factors such as the general economic situation or the introduction of new devices like the video tape recorder. The average rate of growth for quite a few years has been near 10%.

As regards the further development of this market, certain trends have already been initiated with the interactive videotex service. It allows ordinary home TVs to be connected to computing centers over the telephone network and, used as a simple video display unit, as a bidirectional text communication unit. Thus, it gives the conventional equipment used in the distribution network new bidirectional functions. This service recently experienced an important step forward when CEPT (the European Conference of Postal and Telecommunications Administrations) accepted videotex standards that will be adhered to by 26 European Post and Telecommunications (P&T) administrations. We are witnessing the opening of a new market requiring services, in this case programming of contents for interactive videotex, and new types of equipment, in this case accessories to control the new service in conjunction with the conventional TV set.

Bidirectional communication

Bidirectional communications have quite different characteristics than distributed communications. They represent the key to economic development because they enable tele-dialog, tele-discussion and tele-ordering. An analysis of the bidirectional communication market, dividing the field up into speech, text, image, and data communication, illustrates that speech and image communication dominate with 96% of the DM 135 billion market (Fig. 2)—not surprising in view of the fact that communication between human beings usually takes place by means of speech and images rather than texts or data. The latter can be regarded as a confirmation or supplement on spoken dialogue.

Today, some 500 million subscribers are connected to the speech communication network, the world's largest automaton. Subscriber-controlled intercommunication is made possible 24 hours a day by 8 million private branch exchanges, 200,000 local exchanges, 30,000 truck exchanges, 3 billion km of circuits consisting of land and submarine cables as well as radio circuits, 40 satellites with about 350 ground stations and many other installations. These extremely complex systems must operate extraordinarily reliably. Therefore only a limited number of companies are in a position to supply the world market with such equipment.

"Today some 500 million subscribers are connected to the speech communication network, the world's largest automaton."

Dividing the market according to the various systems today (Fig. 5) shows that unlike the distributed system market, this market owes most of its turnover to the infrastructure and not to end-user equipment. Obviously the cable network, and particularly the laying of the cables, accounts for a considerable portion of total investments.

For the cable systems and for standard

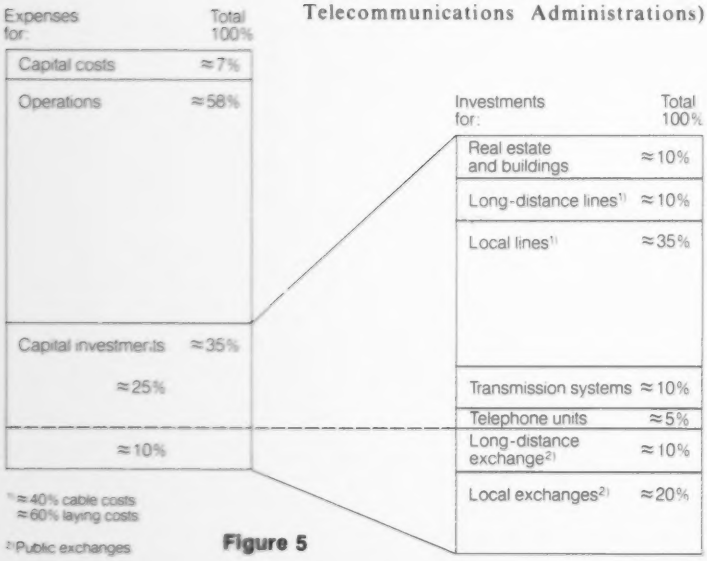


Figure 5

WICHTIGE MITTEILUNG

des Gouverneurs von OKLAHOMA, U.S.A. an alle Geschäftsfreunde in der BUNDESREPUBLIK DEUTSCHLAND

WILLKOMMEN!

Die Auslegung der Verfassung des Bundesstaates Oklahoma durch den Justizminister dieses Staates im September 1979 fand weitgehende Beachtung. Nach seiner Lesart verbietet die Verfassung von Oklahoma ausländischen Anlegern den Erwerb von Grundbesitz in diesem Staat.

Da in vielen amerikanischen Bundesstaaten ähnliche Gesetze herrschen, schien die Möglichkeit für ausländische Geschäftsleute, in diesen Staaten Eigentum zu erwerben, in Frage gestellt.

Fur Oklahoma wurde diese wichtige Frage durch sein oberstes Gericht in folgendem Entscheid geklärt:

Die Verfassung von Oklahoma erlaubt ausländischen Anlegern den Kauf von nicht landwirtschaftlich genutztem Grund und Boden, wenn ihr Unternehmen oder Geschäft in Oklahoma eingetragen ist. Eine ausländische Firma gilt dann als eingetragen, wenn sie einen in Oklahoma eingetragenen Firmennamen hat. Die Eintragung unterliegt keinen besonderen Bedingungen.

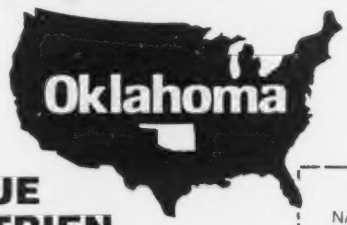
Als Folge dieses Gerichtsentscheids hat die Regierung von Oklahoma beschlossen, ausländische Investitionen in Form von Grundbesitz durch umfangreiche Programme zu unterstützen.

Ich möchte nur zwei Punkte besonders herausstellen:

1. Wir verfügen uber reichhaltige Öl—und Gasreserven. Energieknappheit wird es bei uns nicht geben.
2. Oklahoma bildet Fachkräfte für Ihren spezifischen Bedarf kostenlos aus.

Für weitere Auskünfte wenden Sie sich bitte an das Oklahoma Economic Development Department (Behörde für Wirtschaftsentwicklung) oder an die Deutch-Amerikanische Handelskammer.

George Nigh
Gouverneur von Oklahoma



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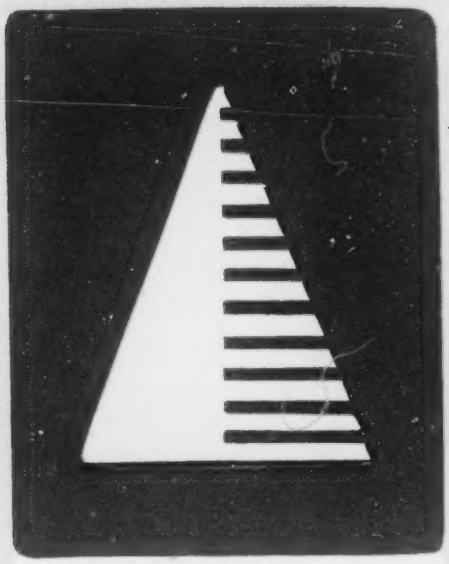

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telephones and small private branch exchanges, almost every country has its own suppliers who may produce some of their products under license agreements.

Large private branch exchanges, local public exchanges, national/international trunk exchanges, satellite and submarine cable systems as well as transmission systems have only been supplied by several major manufacturers in highly industrialized nations, for it was there that the intensive development of the telecommunications networks created the market base essential for the growth of such companies. These companies supply the market with their products and services (Fig. 6); export opportunities, however, are relatively limited because the nations with the highest demand for telecommunications—namely the large industrialized countries like the USA, Japan, Great Britain—have developed their own industries in this field. That part of the world market thus proves virtually inaccessible to foreign telecommunications companies. This means that the structure of market leaders in telecommunications (Fig. 6) more or less reflects the size of the corresponding home markets.

European firms have always had to export because their own home markets are too small. This led to early efforts by European companies towards international standardization to enable them to export products designed to common standards.

A similar situation prevails in the text and data systems area except that the corresponding capital investment lies far below that of speech communication (Fig. 6). Text communication so far has been practically synonymous with teleprinting: approximately 1.3 million subscribers belong to the worldwide telex network. For data communication the telephone network has been employed in most cases, requiring the use of additional devices such as modems (modulators/demodulators). But nowadays modern technology enables the transmission of text and data in an economical and efficient way through common network installations like, for instance, the Integrated Text and Data Network of the German Bundespost.

The bidirectional communication market in Europe is generally controlled by national authorities, such as the P&T administrations, based on the philosophy that communications systems form an important part of a country's infrastructure, and equal treatment of all participants must be ensured just as with roads or water and electricity supplies.

The infrastructure importance of telecommunications and their export value mean that most countries are interested in setting up their own national telecommunications industry. This in turn forces major export-oriented telecommunications companies to establish manufacturing plants abroad if they want to sell their products in those countries.

The job-creating impact of telecommunications and its stimulating effect with regard to other industries encourages numerous governments to promote the development of advanced technologies and

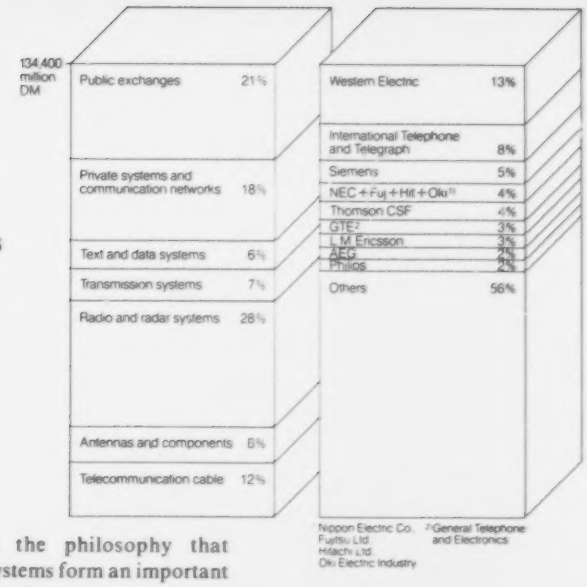

Figure 6

"The infrastructure importance of telecommunications and their export value mean that most countries are interested in setting up their own national telecommunications industry."

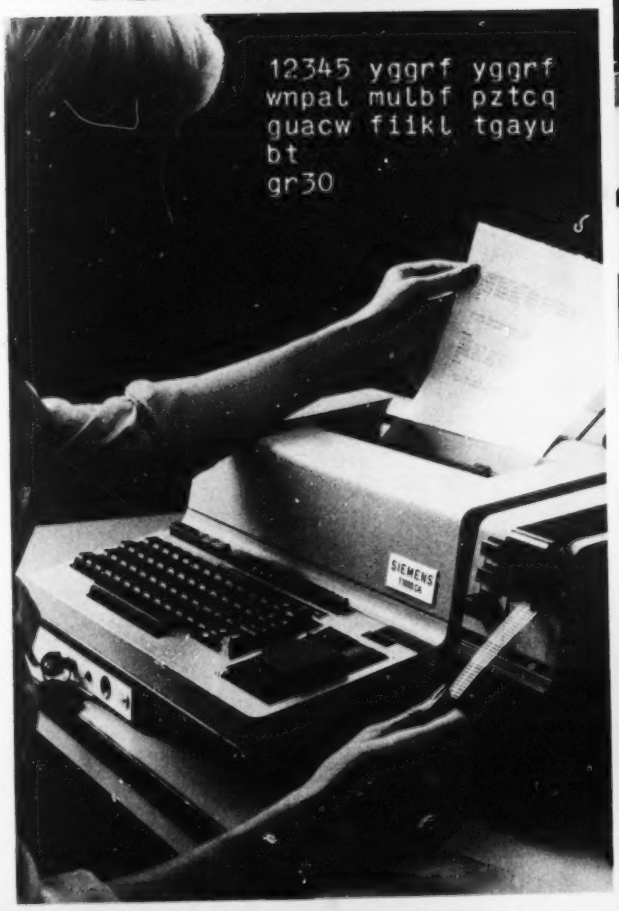
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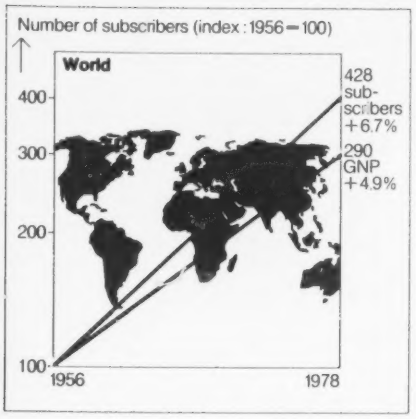
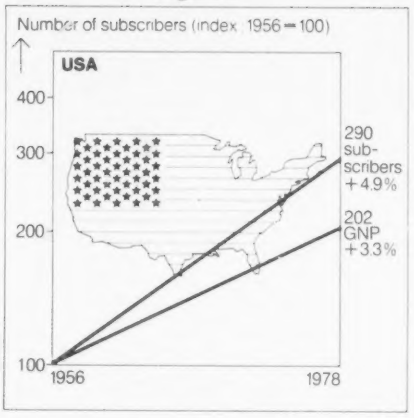
Figure 7





national telecommunications industries. An additional advantage of having such a domestic industry is the savings in foreign exchange.

All this accounts for the fact that in many countries the government is spending large amounts of money to establish an independent telecommunications engineering capability. These government subsidies may distort normal market conditions and may also affect other fields of electronics.

Standardization necessary

Unlike distributed communication systems, with no reaction from the end-user devices to the distributing network, the central task in bidirectional communications is to provide flawless intercommunication. This is also the major reason for international standardization, which has been encouraged above all by the International Telegraph and Telephone Consultative Committee (CCITT) within the International Telecommunications Union. While in the past the USA, for example, paid little attention to international standards (the American market was big enough to allow specific American standards), the emergence of a complex worldwide network will force US companies to participate in CCITT standardization efforts. Clearly, without standardized devices and interfaces, worldwide intercommunication cannot be ensured. Moreover, the US now wants to do export business in telecommunications as well, and this proves possible only with technically compatible systems.

International standardization generally falls within the domain of national authorities, essentially the P&T administrations. In this respect, P&T administrations should participate in the operation, maintenance and marketing of all bidirectional communication systems—including end-user equipment—so that their contributions to standardization are based on practical experience.

The possible ways of acquiring telecommunication equipment vary greatly from country to country at this time. While, for example, telephone sets for private branch exchanges can be purchased or rented only from industry in one particular country, in another country the P&T authority alone provides such units on a rental basis.

For example, in the US a number of different networks for data, telex and telephone are operated by private corporations. If these networks have compatible interfaces and can be interlinked, then telecommunications are really possible. This, however, is sometimes not the case in the national networks, except for instance the AT&T network, which serves about 85% of the traffic and by this virtually created a de facto standardization.

Of course there are also US networks that observe CCITT recomendations and thus can communicate on an international level. This is brought about by customer demands or by de facto standardizing forces such as AT&T.

Given these circumstances, it is probably better to have these networks managed by public administration authorities in a position to introduce standardization legislation and to find support for their policies in international bodies. These authorities must participate in the end-user equipment business to base network regulation on actual experience and

"The office of the future may comprise a telephone with a display and function keys, a video terminal, a telecopier for text and image transmission as well as a terminal for the preparation and transmission of graphics."

knowledge of market requirements.

Future of bidirectional communication

This future has already begun: visually supported telephone conversations (with the aid of telecopiers) are no longer fiction, and simple 2-way data communications via videotex or the retrieval of data via home phone equipment have become routine operations.

This trend will be enhanced by the increased application of digital systems in the exhange and transmission sectors, bringing about not only improved speech-communication quality, particularly over long distances, but also the inclusion of text, data and image communications due to the powerful and cost-effective 64-kbit/sec data carrier offered by digital technology. For instance, a telecopying operation now taking two or three minutes per picture will be done within a few seconds, letting users integrate the picture in their dialogue.

The relevant system presently being discussed on a worldwide scale is called ISDN (Integrated Services Digital Network). It enables not only single but mixed-media communication, allowing the subscriber to choose between speech, text, data and image communication according to his needs.

For such purposes there will be multifunctional terminals. The office of the future may comprise a telephone with a display and function keys, a video terminal, a telecopier for text and image transmission as well as a terminal for the preparation and transmission of graphics. All devices will be hooked up to the communication network over a single line. Similar configurations and devices are conceivable for the home of the future, with the intriguing opportunity of doing business at home.

Even the next step in the development of telecommunications, namely the introduction of a broadband dialogue enabling moving pictures to be incorporated into bidirectional communication, has already been designed. This, however, requires considerable further expansion of the network. As a transmission medium for broadband communication, fiberoptic systems are likely to find use in the long run because glass fibers are ideally suited to broadband conditions and will also be more economical in mass production than the broadband systems with copper cables of today.

Discussions have recently begun on how to standardize broadband communications. In order to ensure prompt implementation of this technology after a final agreement on standardization, it is desirable to use the television standard for moving-picture communication. Thereby—as in the case of videotex systems—the existing TV sets could reduce a part of necessary investments.

In many research centers all over the world devices have already been developed for broadband communication. They include facilities for the transmission of data, text, images and moving pictures, which means that they automatically have the option of receiving TV programs, interactive videotex and broadcast videotex.

In consideration of this variety of new services and technologies, the telecommunications market will certainly experience some restructuring in the next decade. And as a true global telecommunication network comes into existence, companies in some countries will face considerable adaptation tasks with respect to standards and methods. Only those companies that stay in the forefront of technology but that also accurately sense market demands will meet with success. ■

DEUTSCHE ZUSAMMENFASSUNG

In frueheren Jahren war es relativ einfach, den Markt fuer den Bereich der Telekommunikation darzustellen. Die Uebermittlungssysteme beschraenkten sich im wesentlichen auf Telefon, Telegraph und Telex einerseits und Radio und Fernsehen andererseits. Der technische Fortschritt hat hier jedoch eine Reihe neuer Dienstleistungen und Vermittlungstechniken dazukommen lassen, u.a. Telefax, Teletex, Videotex, Kabelfernsehen und-radio, Satellitenfernsehen und-radio und faseroptische Uebertragungssysteme. Das damit ermoeglichte und wesentlich erweiterte Leistungsangebot wird die Umstrukturierung traditioneller Maerkte im Nachrichtenuebermittlungswesen erzwingen und laesst schon heute die Frage nach der Haltung der zustaendigen europaeischen Verwaltungseinheiten dringend werden.

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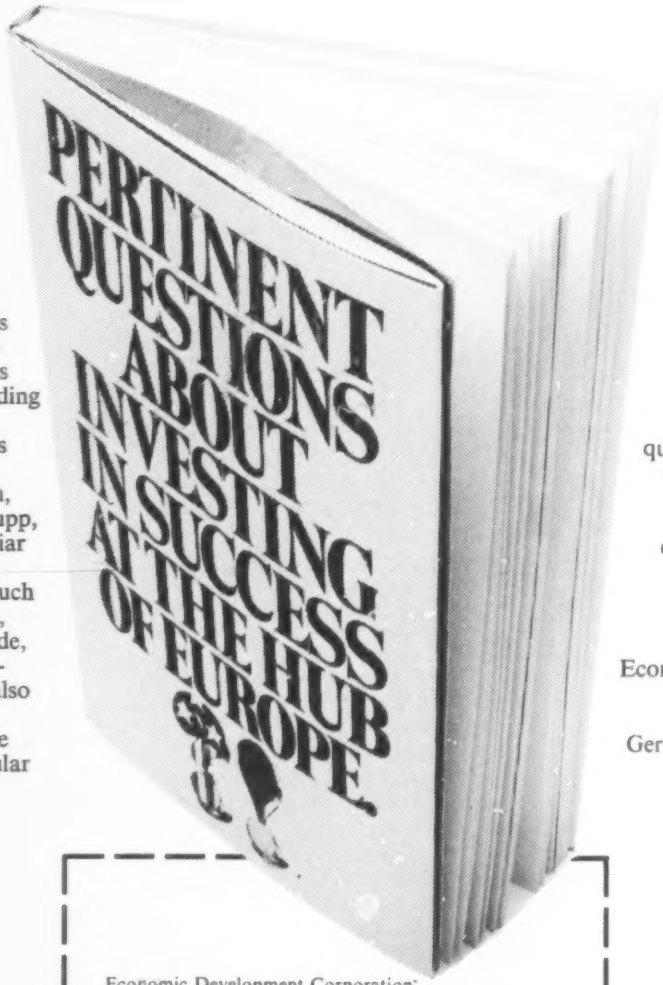

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haengt wesentlich von der Entwicklung seiner Kommunikationssysteme ab. Dies vergisst man leicht in hochindustrialisierten Laendern, in denen die Nachrichtenuebermittlung, gemessen am Weltstandard, vorzueglich funktioniert. Statistiken zeigen, dass die Dichte des Telefonnetzes im direkten Verhaeltnis zum Pro-Kopf-Einkommen in einem Land steht. Weiterhin muss man bei Ueberlegungen zur Notwendigkeit eines Ausbaus des Nachrichtenuebermittlungswesens im Auge behalten, in welch explosiver Weise sich unsere Kenntnisse und Informationsquellen ueber die letzten Jahre hinweg entwickelt haben. Diese Quellen koennen nur durch modernste Telekommunikationsmethoden zugaenglich bleiben, durch Datenverarbeitung und Zugang zu den Speichern in fernvermitteltem Kontakt. Schliesslich sind es die gewaltigen Zahlen, die im Zusammenhang mit der weiteren Entwicklung des Telekommunikationsmarktes genannt werden, die ein ganz besonderes Interesse auf diesen Markt lenken. Bezieht man von Radio und Fernsehen bis zu Teleprintern und Datenuebermittlungen alle Uebertragungsmoeglichkeiten mit ein, so stellt sich hier ein Markt von rund 300 Milliarden DM jaehrlich dar. Schliesslich waechst der Nachrichtenmarkt angesichts der vielfaeltigen Neuentwicklungen, des grossen Innovationsschubes, schneller als das Bruttosozialprodukt der Industrielaender, aehnlich wie das bei den Maerkten fuer chemische Produkte und elektronische Komponenten der Fall ist.

Bei der Darstellung der Kommunikationsmaerkte und ihrer Moeglichkeiten muss man unterscheiden zwischen dem Bereich der ausgestrahlten Kommunikation (distributed communication), ein klassisches Beispiel ist hier das Fernsehen, und dem Markt fuer Kommunikation in Richtung und Gegenrichtung, dessen Charakteristikum am besten durch das Telefon verdeutlicht wird.

Der Markt fuer die ausgestrahlte Kommunikation ist, zumindest in Europa, von der Knappheit an verfuegbaren Sendewellenbereichen gekennzeichnet. Neben der drahtlosen Uebertragung kommt daher dem Kabel zur Uebermittlung von Sendesignalen immer groessere Bedeutung zu. Auch der Satellitentechnik bietet sich hier ein Hauptanwendungsfeld. Eine Fuelle von technischen Einrichtungen ist noetig, um den kuenftigen Bedarf in diesem Bereich zu decken, von der einfachen Antenne bis zur Satellitenantenne, vom einfachen Kabel bis zum Hochleistungskabel. Gleiche Notwendigkeiten ergeben sich bei Sende- und Empfangsgeraeten, sowie den Studios und Uebertragungseinrichtungen. Der Markt fuer die ausgestrahlte Kommunikation ist riesig. Im Augenblick wird er noch in hohem Mass von dem Bedarf an Fernsehapparaten bestimmt. Aber auch hier, bei dem sogenannten "end user equipment", sind technische Neuerungen und Anforderungssteigerungen wesentliche Faktoren der kuenftigen Entwicklung. Natuerlich kommt es in diesem Bereich auch wesentlich auf die rechtlichen Bedingungen an, die von Behoerdenseite zur Steuerung der Entwicklung gesetzt werden.

Einen erheblichen Marktanteil haben die Einrichtungen zur Infrastruktur in diesem Bereich. Waehrend die Terminal-Ausruestungen, die Empfangsgeraete sozusagen, durch Haendler in den Markt gebracht werden, wird die Infrastrukturtechnologie von der Post bzw. der Uebermittlungsfirma bei den wenigen Herstellern auf diesem Gebiet nachgefragt. Es ist sehr schwierig, das Marktvolumen hier in etwa zu evaluieren. Immer wieder gibt es Sonderentwicklungen, z.B. das Videobandgeraet; die Zuwachsraten lagen hier in den letzten Jahren bei 10%. Auch andere Neuerungen berechtigen zu hohen Markterwartungen, beispielsweise das Videotex-Verfahren, das erlaubt, vom Heimfernseher aus ueber das Telefonnetz mit Computern Kontakt aufzunehmen und zu arbeiten; ein neuer Bedarf duerfte sich hier nach Dienstleistungen ergeben, die zur

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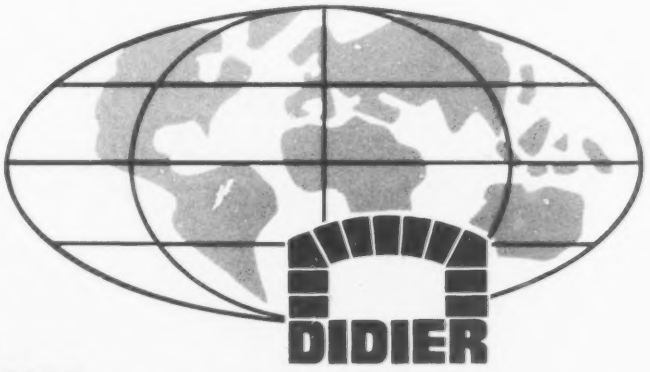
Programmierung von Videotex-Inhalten angeboten werden.

Der Bereich der gegenseitigen Kommunikation hat ganz andere Charakteristika als derjenige der ausgestrahlten Nachrichtenuebermittlung. Auch hier steht eine glaenzende wirtschaftliche Entwicklung bevor, denn es wird der Teledialog ermoeglicht, die Telediskussion und damit beispielsweise der Einkauf und die Bestellung ueber Fernsehen. Ein 135 Milliarden DM Markt bietet sich hier, der zu 96% von Sprech- und Bildkommunikation beherrscht wird, neben der Text- und Datenuebermittlung. Dieses Ergebnis kann als Bestaetigung des menschlichen Beduerfnisses nach Kommunikation angesehen werden. In diesen Bereich faellt das gesamte Telefon-, Telex-und Telegraphennetz, das angesichts der schon jetzt vorhandenen 500 Millionen Teilnehmer und seiner vielfachen technischen Einrichtungen, darunter Tausende von Kilometern Unterwasserkabel, 40 Weltraumsatelliten, 350 Bodenstationen fuer Satelliten usw. mit grosser Genauigkeit und Zuverlaessigkeit arbeiten muss. In diesem Markt entfaellt der Loewenanteil an Investitionen und Einrichtungen nicht auf den Endabnehmer, sondern auf die Infrastruktur. So gross dieser Markt auch ist, er bietet nur geringe Exportmoeglichkeiten. Die grossen Industrielaender, die den hoechsten Kommunikationsbedarf haben, verfuegen saemtlich ueber entsprechende Produktionseinrichtungen, die den Geraete- und Einrichtungsbedarf in diesem Bereich decken koennen. Die Groesse der jeweiligen Unternehmen spiegelt daher im wesentlichen das Volumen des heimischen Marktes wider. Ausdehnung ist hier nur moeglich, wenn die heimischen Standards mit exportiert werden koennen. Anders kann es erst werden, wenn internationale Standards entwickelt sind, die allen Interessenten gerecht werden. Hier sind insbesondere von Europa aus entsprechende Bemuehungen im Gange.

Die Kontrolle ueber den beschriebenen Kommunikationsmarkt liegt in Europa im wesentlichen bei den Postverwaltungen, die dank ihrer Moeglichkeiten auch die Verantwortung fuer die Fortentwicklung der entsprechenden Technologien haben. Hier ist der politische Bereich angesprochen, und so verwundert es nicht, dass immer mehr Laender und Regierungen bemueht sind, eine eigene Nachrichtenuebermittlungsindustrie aufzubauen. Allerdings sollte nicht uebersehen werden, dass die hier unausbleiblichen staatlichen Stuetzungsmassnahmen in einer Reihe von Laendern den Markt ganz entscheidend verzerren koennen, was nicht ohne Auswirkungen auf andere Bereiche der Elektronik bleibt. Auch die Zukunft der Bildkommunikation hat schon begonnen. Laengst ist das Fernsehtelefon technisch moeglich geworden, das Abrufen von Computerdaten ueber das Telefon zu Hause und die Konversation ueber Videotex.

Mit vorliegendem Artikel lueftet der Verfasser fuer seinen Leser ein wenig den Vorhang und erlaeutert die Techniken, die Apparate, die Einrichtungen, die notwendig sind, um die bestehende Vielfalt der Kommunikationsverfahren noch zu verfeinern, zu erweitern und schliesslich zum technischen Fortschritt einzusetzen. Der Autor stellt dabei Anwendungsbereiche und technische Verfahren in einer auch dem Laien verstaendlichen Weise dar. Er zeigt Entwicklungen und Innovationsrichtungen auf und laesst vor dem Leser ein Kaleidoskop der faszinierenden, immer perfekter werdenden, nahezu unbegrenzten Moeglichkeiten im Nachrichtenbereich ablaufen. Fuer die naechsten zehn Jahre sagt der Autor ein globales Nachrichtenuebertragungsnetz vorher, dessen Errichtung grosse Anforderungen an die einzelnen Laender und ihre Industrie stellen wird, wobei aber nur solche Unternehmen auf die Dauer Erfolg haben duerften, die sich der modernsten Technologien bedienen koennen und den Marktnotwendigkeiten am besten entgegenkommen.



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Fitting German Computers into the U.S. Market

by Klaus Luft
Vice Chairman,
Nixdorf Computer AG

"American technology is alive and well," begins a lead article about technology in the Eighties in *Business Week International* (July 6, 1981). *Business Week* contradicts thereby forebodings that the U.S.A.'s leading position is disappearing or indeed has disappeared altogether. For the Nixdorf Computer Corporation such prophecies of doom are speculations in the wrong direction. On the contrary, long-term involvement in the U.S.A. plays an essential role for the firm. As early as 1968 the first step was taken. Since then further activity has been systematically increased. Direct access to technology and new developments was one of three aspects of involvement in the United States which are still valid. Another consideration which has proved timeless is that if one is competitive in the U.S.A. against American producers, one is also competitive in Europe against strong American rivals. Furthermore, the U.S.A. has lost none of its attractiveness as the most consistent data processing market in the world. Yet the bilateral relationship has not proved to be a one-way street; there are advantages on both sides of the Atlantic.

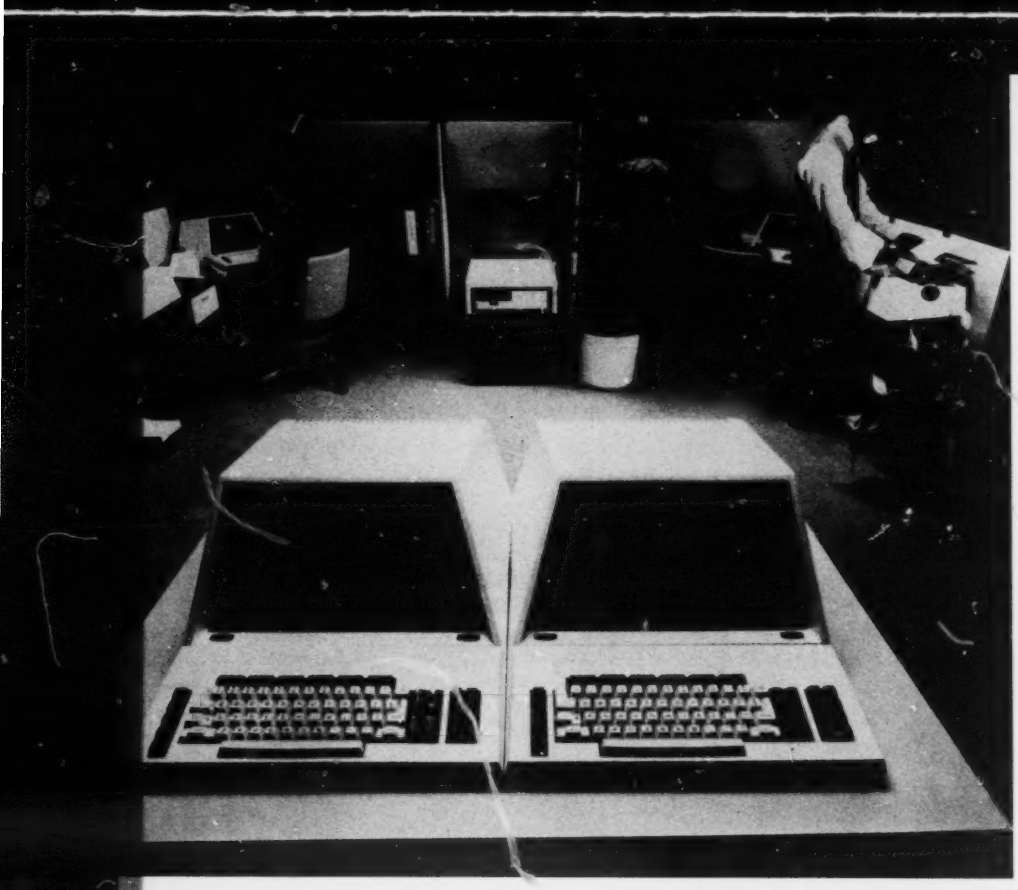
End-user and service oriented

The goals of the firm are the development, production and marketing of products and services in data and information processing.

"The goals of the firm are the development, production and marketing of products and services in data and information processing."

The rapid progress of technology requires manifold activity in the development centers in Germany (Paderborn, Munich and Berlin), in Holland (Utrecht), and in the United States (Burlington, Massachusetts; Richmond, Virginia; and Silicon Valley, California). Nixdorf enhances its own achievements through international cooperation, to which American businesses, above all, contribute supplementary technological know-how.

The product spectrum encompasses modular-built system families of computer and computer-related equipment,which can be used according to performance and capacity needs at all levels of business organization, from plant management to data process centers. Special systems for use in financial institutions and commercial enterprises complete the product palette, along with programs and organization flow

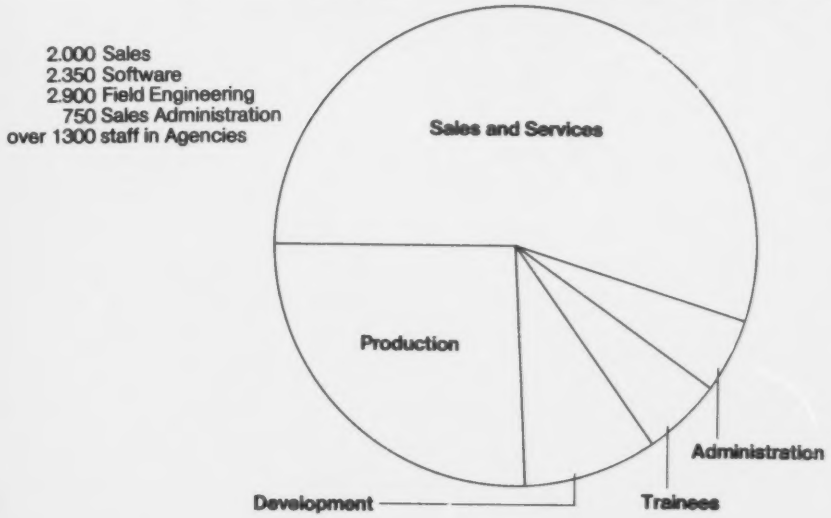


charts for word processing, news broadcasting and telecommunications.

International division of labor defines the production approach. In Germany, this consists of a central assembly plant in Paderborn and other production facilities in Cologne and Berlin. In addition to these, Nixdorf has built an assembly plant in Ireland. Individual contractors will be located there.

Computer installations intended for the American market are largely produced in the U.S.A., specifically in North Reading, Mass.

14,000 employees world-wide, more than 8,000 of these in the Sales and Services organisation



Qualified personnel, who are supported in all aspects of production by the most modern technology, as well as continuous inspection and testing in all phases of production, contribute to the impact of "Nixdorf Computer" as a standard in the international market.

With its comprehensive product-and-service package, Nixdorf has moved into 31 countries. The markets of Europe and North America create a center of gravity for sales activity. About 90 percent of the firm's business is concentrated there.

The sales department succeeds largely through a network of branch offices. In several countries factory salesmen are active as well. The market strategy addresses the demands and requirements of the users, who expect specialists experienced in their line of business as consultants for their purchasing decisions. For this reason Nixdorf has concentrated the knowledge of its specialists in trace-oriented branch offices and service centers, such as, for example, the placement of data processing equipment in industrial, financial, insurance, commercial, catering, and public administration firms. This mandate to provide trade-oriented consultation and service appears also in the software sector in broad-spectrum availability of specialized solutions to problems in particular trade areas.

Among our customers are firms of all sizes and lines of business: industrial and commercial firms, public administration and financial institutions, internationally active concerns as well as enterprises of moderate size. The users of Nixdorf systems – apart from exceptional instances of highly sophisticated installations – do not need specialized knowledge of computers, as simple maintenance and automatic programming keep the work going at the computer terminal. Maintenance and service offices for every aspect of computer installation are available to Nixdorf customers in branch offices and service facilities. The density of this network guarantees the user quick access to services such as, for example, technological assistance to the customer, which ensures the most interruption-free operation of customer equipment possible by means of preventitive maintenance and the installa-

"This user-orientation is reflected in the development and production fields, just as in the sales organization."

"The market strategy addresses the demands and requirements of the users, who expect specialists experienced in their line of business as consultants for their purchasing decisions."

tion of new technological developments such as automatic long-distance monitoring and adjustment. With continuous expansion of the service network in the customer's locality, Nixdorf strengthens the partnership it strives to maintain with its customers.

Nixdorf personnel are experts, qualified in specialized fields, whose activitites are adapted to the greatest possible degree of the computer user. This user-orientation is reflected in the development and production fields, just as in the sales organization. In this area of the firm, service is the central focus of responsibility for two-thirds of all personnel. This is true for organization and systems technology as well as software and training. All personnel are given great scope for individual responsibility and independence in the fulfillment of their assignments.

Rapid technological change requires constant adaptation to the state of the art. Nixdorf handles this necessity by taking responsibility for substantial investments in training and up-grading for its own and customer personnel.

Nixdorf in the United States

Continuous expansion of activity in the U.S. characterizes the commitment in America. The goal, to create a far-reaching identification with the principal input market in the U.S.A. and this large outlet for export products, is being approached step-by-step. The salient milestones are:

"Continuous expansion of activity in the U.S. characterizes the commitment in America."

1968 Factory-salesman contact with the American firm, Victor Comptometer Corp.

1972 Purchase of the franchise, founding of a subsidiary corporation.

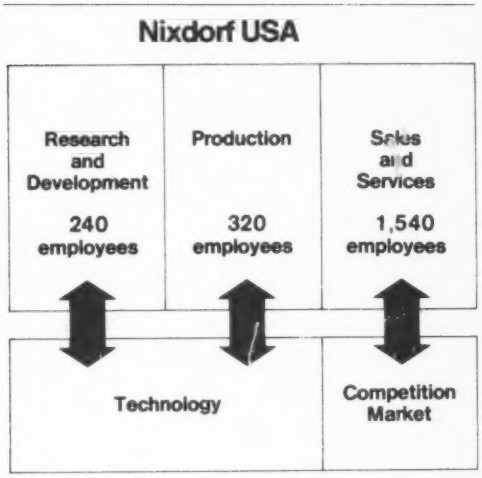
1973 Takeover of Entrex Corp. production.

1974 Takeover of Entrex production licenses.

1977 Takeover of Entrex and integration with Nixdorf Computer Corp.

1979 Annual returns exceed $100M for the first time.

1980 Acquisition of the American software firm The Computer Software Co., Richmond, Virginia (TCSC) and renaming as Nixdorf Computer Software Company (NCSC).



The importance of service orientation is reflected clearly in the structure of NCC: the sales and service network encompasses over 130 cities. 70% of the more than 2,000 employees are active in the sales and service branches of the firm. They prove their worth daily in competition in the toughest market in the world and inform all the firms under our umbrella of influences and developments from the U.S. They do this extremely successfully: Nixdorf Computer Corporation accounts for about a 20% share of Nixdorf business, worldwide. In the ranked list of the 100 most important computer firms, published yearly by Datamation, NCC has moved 4 notches up to 51st place within a year's time.

Income from our American subsidiary corporation grew to the equivalent of DM 253 million, which represents a 38% growth. This result was achieved despite unaltered tough competition.

A summary of the highlights:

- Equipment inventory is being continually expanded.
- We are number one in the market for data collection systems.
- Leasing business is burgeoning.
- Our sales and service network includes branch offices and service centers in more than 130 cities.
- A high standard of excellence distinguishes our employees, who numbered approximately 2,000 in 1980, an increase of 400.
- Our own development facilities make possible active contribution, as well as current access to American technology, which is significant in the international computer industry. The number of our employees in production and development has doubled since 1979.

"At all levels of the firm, ... U.S. citizens bring their unique knowledge and abilities to NCC."

- We have built up our production capacity, so that most of the computers intended for American customers can be manufactured in the United States. 320 employees here are concerned with technology and emphasis on quality as is the German parent company.

Sales activities for 1980 were essentially determined in the United States by the fact that we were again able to install more data collection systems than any other manufacturer. This firmly established our position as market leader in this sector. In dealing with customers from small and middle sized firms, our success was concentrated in the introduction into selected trade areas of the Magnetic Disc System 8870. In addition, we registered

"In 1980 we opened up greater possibilities for access to American computer know-how with the establishment of a new Technology Center in the California heartland of technology, Silicon Valley, near San Francisco."

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"Half of Germany's top 10 banks are Frankfurt-based. We're one of them."

Let's start with Frankfurt. Why is Frankfurt so important?

"Frankfurt ranks among the world's foremost banking and financial centers. 150 German banking institutions operate here, and Frankfurt has more international banks than any other city in Continental Europe.

The Bundesbank is headquartered here, and the Frankfurt Stock Exchange is Germany's largest, accounting for nearly half of the stock exchange transactions, two-thirds of its dealings in foreign shares and some 80 per cent of the business in foreign fixed-interest securities.

Perhaps less well-known internationally is that Hessische Landesbank is one of Frankfurt's big native-born banks. Half of Germany's top 10 banks are Frankfurt-based. We're one of them."

About the bank itself. What are its size and structure?

"With total assets of more than DM 54 billion, Hessische Landesbank is Germany's 10th largest bank, 3rd among Landesbanks. It is a government-backed regional bank with its liabilities guaranteed jointly by the State of Hesse and its Sparkassen and Giro Association. We also act as banker to the State of Hesse from which our name is derived, and perform clearing functions for the 52 local Sparkassen."

What about your service facilities?

"As a German universal bank, our facilities cover the full range of commercial and investment banking services. Internationally, we concentrate on wholesale banking and medium to long-term financing.

Recently we have also significantly expanded our money market operations, drawing on the combined facilities of our London, New York, and Luxembourg dealing rooms.

Moreover, we participate regularly in international bond, note and share issues, and perform brokerage functions for international investors. Our membership of the Frankfurt Stock Exchange facilitates dealing in quote shares and fixed-interest securities."

And sources of funds?

"A large part of our funding is done by issuing our own bonds and SD Certificates (Schuldscheindarlehen). The total outstanding is over DM 22 billion. As well, corporations, governments, and other institutional investors consider Hessische Landesbank a prime name for large-scale deposits."

Financial Highlights	DM million	
December 31	1979	1980
Business Volume	51,843	57,195
Balance sheet total	49,150	54,427
Total credit volume	41,420	45,542
Short-term assets	10,133	11,806
Due from banks	7,700	7,683
Due from customers	2,433	4,123
Long-term lending	25,865	27,466
Lending to banks	3,719	4,192
Lending to customers	22,146	23,274
Short-term liabilities	10,312	13,447
Long-term liabilities	6,847	7,262
Bonds issued	21,248	22,354
Capital and reserves	**1,086**	**1,151**

Who are the bank's main clients?

"As a wholesale bank, our service facilities are tailored for large, internationally-active corporations, foreign governments, and financial institutions, as well as subsidiaries of international companies operating in Germany. As bankers to the State of Hesse, we support statewide and municipal programs, and work closely with Hesse's Sparkassen and their clients, for example on the foreign side."

How do you see your position developing internationally?

"Without neglecting our home base in Frankfurt, we have assembled a team of banking professionals devoted to building a strong international track record based on pragmatic banking principles, the most modern technical and support facilities, and the highest standards of client service. International banking is quite competitive, and banks that try harder for their clients and give them fast, personal service often have the edge. This is one of our major objectives."

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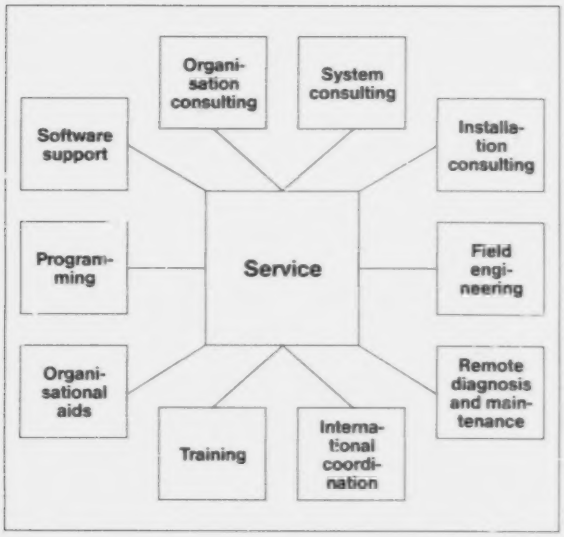
D-6000 Frankfurt/Main
Tel.: (0611) 132-1, Tx: 415 291-0

New York Branch
499 Park Avenue
New York, New York 10022
Tel.: (212) 371 2500, Tx: 234 426

Helaba Frankfurt
Hessische Landesbank -Girozentrale-



increasing receptiveness of large American firms to our products and services.

In the development sector we employed the proven approach of technological cooperation between our German and American development centers. The utilization of and rapid conversion to new technological advances in products service are the crux of this approach, which employs a sensible division of labor. In 1980 we opened up greater possibilities for access to American computer know-how with the establishment of a new Technology Center in the California heartland of technology, Silicon Valley, near San Francisco.

One of the essential accomplishments of 1980 was the acquisition of the American software house "The Computer Software Company" located in Richmond, Virginia. This company, operating presently as "Nixdorf Computer Software Company" is, above all, conspicuous for its efficiency in the development of business systems and components. Included in this is most importantly the supplying of an IBM-compatible, virtual operations system and supplementary systems, which can substantially increase workability and utilization of capacity of data processing systems. We use the software know-how of this group of specialists primarily in connection with our activities in the area of IBM-compatible computer terminals.

Of essential significance for a firm

oriented toward technology and innovation is an intimate knowledge of the final user's wishes and expectations, so as to be receptive to and assimilate ideas, and a solid grounding in forward-looking technology. Intimate contact with a market is the only way to be aware of the most accurate trend indicators in that particular market. At all levels of the firm, therefore, U.S. citizens bring their unique knowledge and abilities to NCC. This utilization of local experts is true of all Nixdorf subsidiaries, as is the strategy of giving employees broad individual responsibility and scope for decision making.

Readiness to accept responsibility and make decisions are the key concerns for an optimum partnership with the customer in all phases of marketing as well as service. We feel confident that clearly delineated predictions make it possible for the firm to know the end-user's exact wishes, to take them seriously, and to interpret them. There may be a certain backlog of demand in the American market which strengthens the solid basis for further expansion. ■

DEUTSCHE ZUSAMMENFASSUNG

"Amerikas Technologie lebt und ist wohlauf" stellt Business Week International einer Titelstory (6. Juli 1981) ueber Technologien der achtziger Jahre voran. Business Week kontert damit Unkenrufe, die die fuehrende Position der USA schwinden oder gar geschwunden sahen. Fuer die Nixdorf Computer AG waren solche Kassandra-Visionen Spekulationen in die falsche Richtung. Im Gegenteil, das langjaehrige Engagement in den USA spielt fuer das Unternehmen eine wesentliche Rolle. Bereits zu einem fruehen Zeitpunk, 1968, wurde der erste Schritt getan; die weiteren Aktivitaeten wurden konsequent ausgebaut. Der direkte Zugang zu Technologie und Neuentwicklungen war einer der drei Aspekte fuer das Engagement in den USA, die immer noch gueltig sind. Als zeitlos erwies sich auch die Ueberlegung: Wer in den USA gegen amerikanische Hersteller wettbewerbsfaehig ist, ist es auch in Europa gegen den starken amerikanischen Mitbewerb. Und an ihrer Attraktivitaet als groesster zusammenhaengender DV-Markt der Welt haben die USA nichts eingebuesst. Die bilateralen Beziehungen sind indes nicht zu einer Einbahnstrasse geraten; Vorteile gibt es auf beiden Seiten des Atlantiks.

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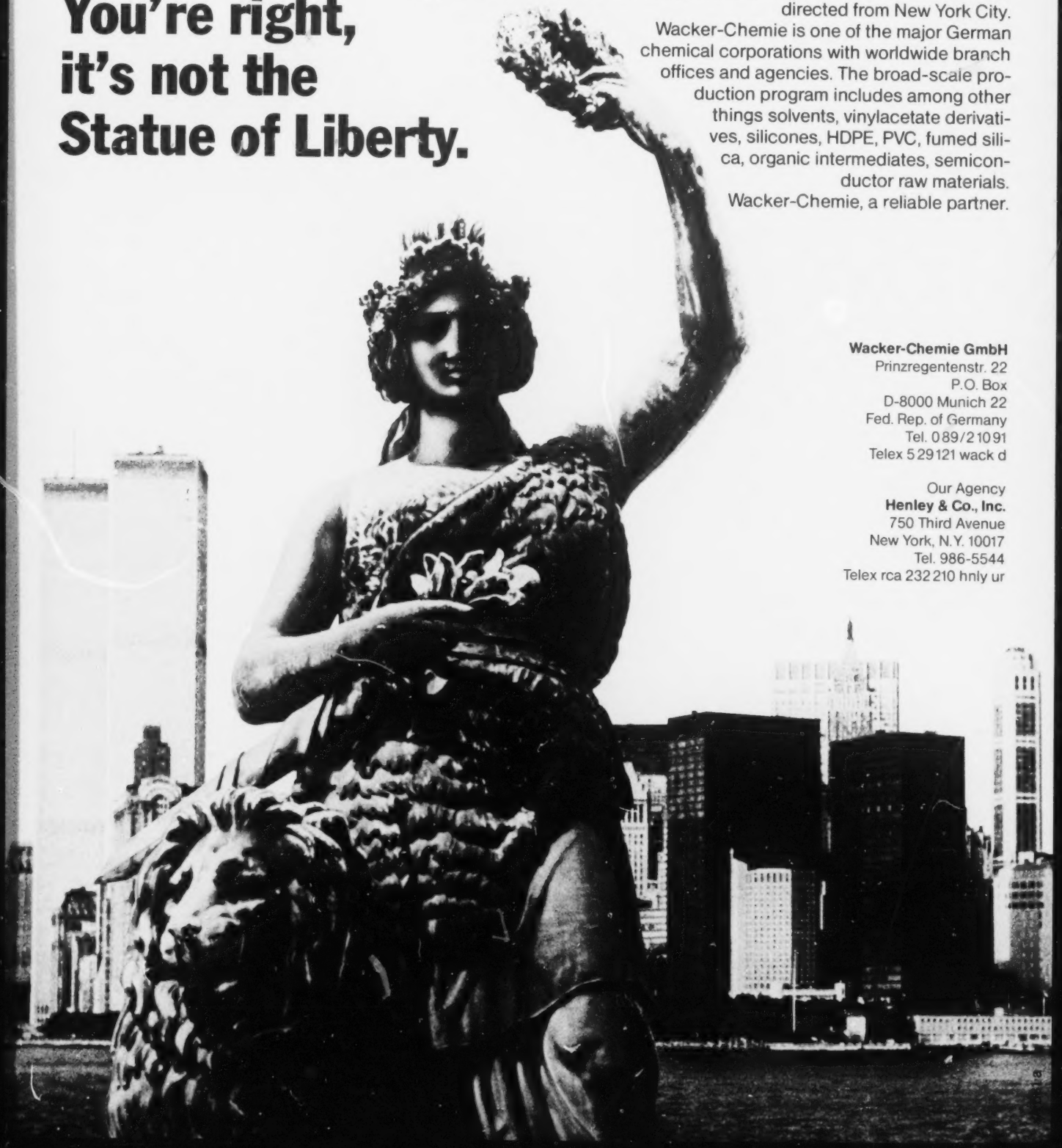

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Prinzregentenstr. 22
P.O. Box
D-8000 Munich 22
Fed. Rep. of Germany
Tel. 089/21091
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Executive Compensation in Germany and the United States: A Comparison

by Kienbaum Unternehmensgruppe GmbH
Duesseldorf

Gross income of managers in the USA—mainly because of the rise in the dollar—averages a maximum of 10% higher than that of German managers, at least in areas of industrial concentration in the East and North, as well as on the West Coast. In rural areas of the United States, as well as in the Central States, the South, the Southwest, and in large parts of the West, compensation is at about the same level as average compensation in Germany. Increases in base salaries (fixed incomes) equal about 8% in Germany and about 10% in the USA.

These figures are the result of a study of employee compensation carried out by Kienbaum Management Consultants, a Gummersbach, Germany-based international management business consulting firm. In a comparison of the gross income of managers in industrial areas in the USA with the income of German management, the following averages were obtained (sampling date: August 1, 1981) for managing directors, as well as for executive employees of the first level below managing directors (see Table I):

It was ascertained that chairmen of the board of the biggest companies in the Federal Republic of Germany and in the United States received compensation ranging from DM 600,000 to DM 1,300,000 in Germany and $300,000 to $800,000 in the USA (extraordinary salaries were not included). Chairmen of the board or chief executive officers in the Federal Republic of Germany generally receive compensation that is 35-50% higher than that of their [American] counterparts whose responsibilities are often limited to specific departments. Depending on the size of the business, the difference between top management and the first level below top management is about 100%, and between the first and second levels it is about 30%. The situation in the USA is similar.

On the other hand, the trend in the United States toward paying Christmas and

TABLE I

	USA in thousands of $	Federal Republic of Germany in thousands of DM
Managing Director	92	211
General Sales Manager	50	117
Advertising Manager	37	96
Marketing Manager	49	111
Personnel Manager	44	98
Financial Manager	40	101
General Counsel	55	117
Data Processing Manager	41	91
Purchasing Manager	35	92
Research and Development Manager	51	113

vacation bonuses amounting to an extra month's salary (payable in June or July) has not gone very far. In the United States twelve-month salaries still predominate.

Various criteria influence the amount of salary paid to managers. The first is the size of the business. The higher the sales of the company or the larger the number of employees, the higher the salaries. In the case of top managers, the branch of industry does not play a particularly large role. It is more likely to make a difference for managers of the first and second levels below top management.

In both countries, top managers in the chemical industry receive the highest incomes. Above all, in the Federal Republic of Germany at least, great value is placed on education. The compensation here to the holder of a doctoral degree may be as much as 50% higher than to a secondary-school graduate. Of course, most people with a university education are to be found in the big companies, in which the highest salaries are paid anyway, and fewer of them go to the small or medium-sized firms. But even in the smaller concerns, the proportion of employees with university educations is increasing.

This tendency is not quite as obvious in the USA as it is in Germany although here, too, the candidate with a university or college degree is evaluated more highly. Even the self-educated man, who has continued his education through the years by means of self-study and various jobs, is given a chance to prove himself on the basis of performance and professional experience. It is difficult, however, to establish guidelines for evaluating performance objectively.

for top managers. Foreign subsidiaries are often the exception. Here native managers are paid according to the level of the country and other criteria, and expatriate managers, according to a special level of compensation.

The particular region of the country (this is especially true in the USA) or the size of the city or community also plays a great role because cost of living and housing varies greatly from region to region and community to community. At the first of the year, the cost of living indexes were as follows:

Cost of Living Indexes	
Germany-cities with a population of over one million and industrial areas	100
Germany-smaller communities	95
New York area	90
West Coast of USA	86
Comparison of Cost of Living and Housing	
Germany	100
West Coast of USA	90
Industrial regions of USA	103

Additional criteria for compensation are age and the proprietary relationship of the company, as well as the status of the company (of lesser importance).

Net income after taxes and social security payments was also examined. In studying the gross income of $40,000 and $100,000 for unmarried managers, married managers with no children, and married managers with two children, it was ascertained that there was very little difference between remaining net incomes of German and U.S. managers (see Table 2).

In Germany, of course, Government social insurance contributions are higher than in the USA. On the other hand, as a result of the split between Federal and State taxes, income tax is higher in the USA.

Since the benefits of Government and company social insurance (especially old age benefits) are, in many cases, not as comprehensive in the USA as in the Federal Republic of Germany, American managers are forced, in addition, to enter into expensive private insurance arrangements. As a result, their [net] incomes are reduced even further.

In addition to 12-13 regular (fixed) base

TABLE II

Gross Income	Country	Single	%	Married	%	Married with 2 Children	%
$ 40,000	U.S.	$23,200	58	$25,600	64	26,800	67
$ 40,000	Fed. Rep. of Germany	$22,400	56	$26,000	65	$26,800	67
$100,000	U.S.	$49,000	49	$52,000	52	$53,000	53
$100,000	Fed. Rep. of Germany	$49,000	49	$54,000	54	$55,000	55

In both countries, the profit situation of the enterprise plays an important role in the determination of salaries. This is more the case in the USA than in Germany, particularly with respect to the amount of fringe benefits and variable compensation which is always related to the economic situation of the company. The proprietary relationship of the company is also important (insofar as it affects areas of responsibility). Managers of companies that are dependent on another concern generally have lower incomes than managers of the parent companies. This is particularly true

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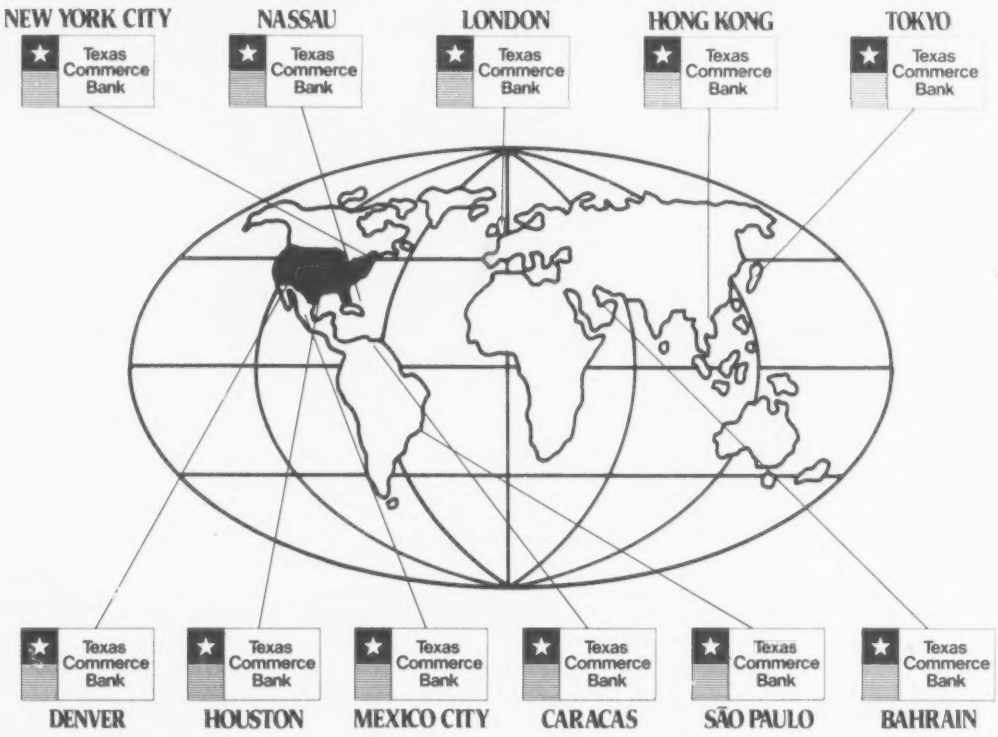

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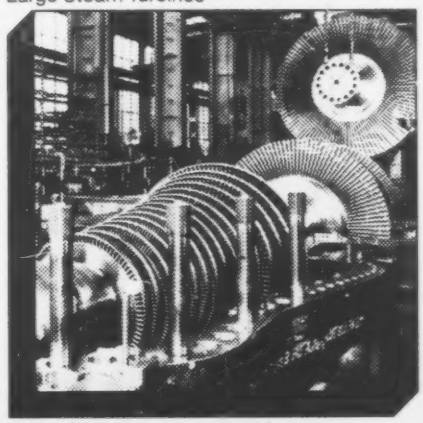

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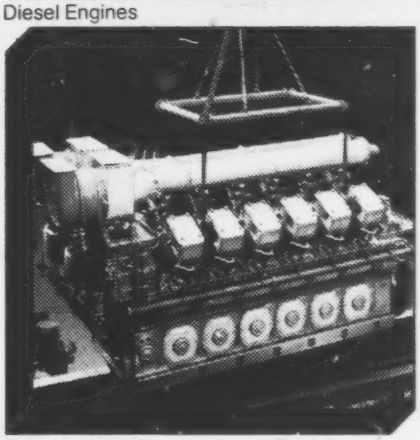

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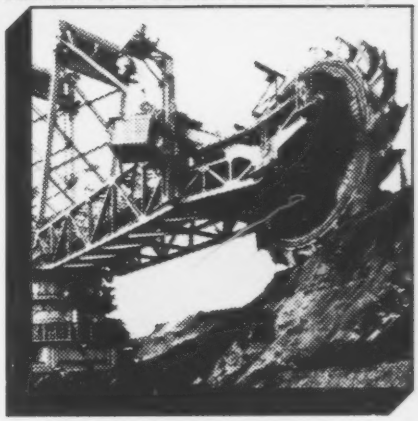

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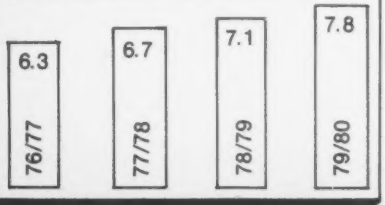

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salary payments, profit-sharing makes up an important part of total annual income. Both in the United States and in Germany, the majority of top managers share, in some form, in the success of the enterprise.

The incomes of top managers of the largest US companies are, to some extent, considerably higher than those of their German counterparts. This is due partially to the position of the dollar, but is mainly due to the higher proportion of variable perquisites (and profit-sharing) paid in the USA. In the United States this amounts to a maximum of 70% of total annual income, and in the Federal Republic of Germany, to a maximum of 30%. On the average, managers in the United States receive 35% of total earnings in some form of profit-sharing. In Germany, this figure is 20%.

Variable perquisites in Germany are distributed mainly in the form of percentages and/or premiums, and in the USA, both in the form of an annual bonus payment and deferred profit-sharing systems. Company social security insurance benefits are generally not counted as part of fixed or variable salary but are considered extra benefits.

"The incomes of top managers of the largest US companies are, to some extent, considerably higher than those of their German counterparts."

Customary profit-sharing plans in Germany may be differentiated as follows:

Premium Non-obligatory special payment that has been agreed upon, the amount of which is fixed according to the independent judgment of company management.

Percentage [usually in form of director's fee] Contractually promised, supplementary compensation, usually in relation to specific success (profit, production, sales).

The purpose of profit participation is to reward top management for talent and performance that has contributed to the economic success of the enterprise. However, the premium—a voluntary payment usually determined according to frequently incomprehensible criteria that change from year to year—has the disadvantage in the long run of not motivating performance toward specific goals. As a result, it is often not in direct relationship to the individual's performance. Because of the lack of guidelines to determine what the amount should be, it is felt to be rather arbitrary. Over the short term, of course, and herein lies the advantage, the premium can be used to reward special performance.

Percentage can create the incentive for performance that is expected from profit participation. However, it is often difficult to establish a suitable basis for the percentage. On the one hand, the amount should be relevant to the whole enterprise; on the other hand, however, it should be in the closest possible relationship to individual performance of top management. The method of calculation should be as simple as possible and the recipient should be able to check it. Profit figures should be determined as quickly as possible so that the interval between receipt of profit and reward is not too great. Guidelines for determining percentages should be set up on a long-term, or at least intermediate-term, basis to prevent short-term manipulation of amounts.

"The purpose of profit participation is to reward top management for talent and performance that has contributed to the economic success of the enterprise."

In order to exclude certain financial risks—especially for newly employed management personnel—percentage guarantees are frequently offered; that is, a minimum amount of profit-sharing is guaranteed. This percentage is frequently tied to profit and production. But profit/sales combinations and the degree to which set goals have been reached often determine the amount of percentage income as well. The so-called "bonus" in the USA corresponds somewhat to the German percentage system. It involves a short-term incentive plan in which there is frequently a choice between cash payment and compensation in the form of stock or investment shares.

Along with the usual short-term bonus or incentive plans, many U.S companies have so-called deferred profit-sharing plans (profit participation with deferred pay-out). This form of capital participation corresponds somewhat to the German employee-investment-funds plan. It differs from the cash-pay-out plan in that the

money is invested, and not made available to employees until a later date.

If certain requirements are fulfilled, these plans have tax advantages. The freedom of investment policy has led to a multiplicity of investment alternatives, such as cash and demand deposits, government bonds, industrial debentures, investment certificates, mortgages, stock in one's own or other companies, real estate, and insurance. Fund systems frequently form the basis for the company pension systems of U.S. concerns; that is, employees can require that the fund guarantee a pension making it possible to distribute the pension payments over 5, 10, or 15 years. It is, of course, also possible to have the total value paid out after a certain period of time. With profit-sharing systems, moreover, money is also accumulated for life insurance premiums, illness, disability, survivor's benefits, periods of unemployment, or building loans.

"At present, about 80% of the top managers in the USA and about 90% in Germany have some form of pension plan."

80% of U.S. companies have pension systems based on a combination of pension and profit-sharing plans. In general, however, top managers receive no more than 60% of their last fixed income, including the minimal Government social security benefits. In Germany, this figure is about 70%. Since, in general, Government health insurance reimburses the cost of medical treatment only for people retired on social security and invalids, supplementary health insurance and other supplementary and social benefits are frequently financed by the companies, with the aid of the fund or other plans (since Government support is minimal). Employers may claim expenditures for company pension systems as business expenses in the USA and in Germany, as long as they meet the requirements of the respective industrial pension laws. In the USA they must also be approved by the tax authorities as qualified plans. In the United States, as well as in Germany, company pensions may also be

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provided for in the form of conventional pension plans (not fund systems) or by direct insurance systems. In the Federal Republic of Germany, this is done partly through industry agreements, and in the United States through wage agreements. Recently, however, individual pension arrangements have also been increasing in the USA. Conventional supplementary health insurance plans (generally in cooperation with the HMO) are frequently found in the USA.

In Germany, the *company pension system* is considered industry's *most* important social achievement. Top managers in Germany generally have supplementary pensions (often in addition to other social security benefits). In small and medium-sized German companies, direct insurance systems prevail. This trend is also evident in the USA. In Germany, furthermore, it is possible to set up pension plans (supplementary social security benefits, similar to insurance, but separate from the company capital, and financed by employer and employee contributions) and provident funds (dependent on the company). As a rule, all the employees of a company are members of these pension plans. At present, about 80% of the top managers in the USA and about 90% in Germany have some form of pension plan.

In addition, many companies in the USA have set up life insurance for their top managers (the average is twice the annual base salary).

Accident insurance is widespread in both the USA and Germany. On the average, the total amount of insurance payable upon death is about equal to the total annual income: in the event of disability it is doubled. 75% of management personnel in the USA and in the Federal Republic of Germany are covered by this type of accident insurance.

Company cars should also be mentioned as an additional fringe benefit. In contrast to German companies, U.S. companies only rarely make company cars available for both business and private use. The percentage of employees with company cars is very small in the USA.

On the average, vacation time for German management personnel amounts to 30 working days. Managers in the USA have an average of 25 vacation days. ■

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DEUTSCHE ZUSAMMENFASSUNG

Die Bruttobezuege des US-Managers liegen—hauptsaechlich bedingt durch die Dollarhausse—zumindest in den industriellen Ballungsgebieten des Ostens und Nordens der USA, sowie der Westkuestenregion, im Durchschnitt bis maximal 10% ueber denen der deutschen Manager. In laendlichen Regionen sowie der Zentralregion, im Sueden, Suedwesten und grossen Teilen des Westens der USA, ist die Verguetung in etwa auf gleicher Hoehe mit der durchschnittlichen deutschen Verguetung.

Bei den Vorstandsvorsitzenden der groessten Konzerne in der Bundesrepublik Deutschland und in den USA wurden (absolute Ausreisser wurden nicht gewertet) Verguetungen zwischen DM 600 TD und [illegible] Mio. in Deutschland und 300 bis 800 TD Dollar in den USA ermittelt. Vorstandsvorsitzende oder 1. Geschaeftsfuehrer haben in der Bundesrepublik Deutschland mindestens 35-50% hoehere Einkuenfte als ihre Vorstands-bzw. Geschaeftsfuehrerkollegen, die haeufig lediglich bestimmte Resorts verwalten. Der Abstand zwischen der 1. Ebene und der Geschaeftsfuehrung betraegt—je nach Unternehmensgroesse—etwa 100% und zwischen der 1. und 2. Ebene ca. 30%. Ein aehnliches Bild ergibt sich in den USA.

Dagegen ist in den USA der Trend, Weihnachts—und Urlaubsgeld (zahlbar Juni/Juli), meistens in Hoehe eines 13. Monatsgehalts, zu zahlen, sehr wenig verbreitet. 12 Gehaltszahlungen ueberwiegen dort.

Wichtig fuer die Hoehe der Bezuege des Leitenden Angestellten sind diverse Kriterien. Das erste ist die Unterhehmensgroesse. Je groessere Umsaetze das Unternehmen vorweist bzw. je hoeher die Beschaeftigtenzahl ist, desto hoeher sind die Gehaelter. Die Branche spielt bei Top-Managern keine besonders grosse Rolle. Bei den Leitenden Angestellten der 1. und 2. Ebene unterhalb der Geschaeftsfuehrung faellt sie eher ins Gewicht. Die hoechsten Bezuege erhalten in beiden Laendern Top-Manager der Chemiebranche. Vor allem die Ausbildung hat zumindest in der Bundesrepublik Deutschland einen grossen Stellenwert. Hier kann die Verguetung eines promovierten Akademikers bis zu 50% hoeher als die eines Volksschulabsolventen sein. Allerdings sind die meisten Akademiker in grossen Konzernen, in denen sowieso die hoechsten Gehaelter gezahlt werden, und weniger in kleinen oder mittleren Unternehmen zu finden. Aber auch in den kleineren Unternehmen nimmt der Akademikeranteil zu. Diese Tendenz ist in den USA nicht so stark zu erkennen wie in Deutschland. Hier wird ebenfalls der Kandidat mit dem Universitaets—oder Collegeabschluss aufgewertet. Jedoch auch der Autodidakt, der sich im Laufe der Jahre durch Selbststudium und diverse Jobs weitergebildet hat, bekommt seine Bewaehrungschance. Dies alles ist in Verbindung mit Leistung und Berufserfahrung des Managers zu sehen. Eine objektive Leistungsbeurteilung erweist sich allerdings als schwierig.

Eine bedeutende Rolle bei der Gehaltsfixierung spielt in beiden Laendern die Ertragslage der Unternehmen. Sie macht sich bei der Gehaltsfestsetzung der US-Management-Gehaelter, d.h. vor allem bei der Hoehe der variablen Verguetungsanteile, noch staerker bemerkbar als in Deutschland. Jedoch muss sie immer unter dem Blickwinkel der konjunkturellen Situation betrachtet werden. Auch die Konzernzugehoerigkeit ist unter Beruecksichtigung der Intensitaet der Aufgabengebiete von Bedeutung. Manager von konzernabhaengigen Unternehmen haben meistens niedrigere Einkuenfte als Manager der Muttergesellschaften. Dies gilt vor allem fuer Top-Manager. Ausnahmen bilden oft die auslaendischen Tochtergesellschaften. Hier werden einheimische Manager nach Landesniveau und sonstigen Kriterien und entsandte Manager nach einem speziellen Verguetungsniveau bezahlt. Dabei spielen auch die jeweilige Landesregion, vor allem in USA, bzw. die Groesse der Stadt oder der jeweiligen Gemeinde eine Rolle. Weitere Verguetungskriterien sind das Alter und auch die Firmen—und Positionszugehoerigkeit.

Bei einer Untersuchung der Bruttoeinkuenfte von 40.000 US-Dollar und 100.000 US-Dollar eines ledigen Managers, eines verheirateten Managers ohne Kinder und eines verheirateten Managers mit zwei Kindern wurde ermittelt, dass bei den nach Steuern verbleibenden Nettobezuegen der deutschen und US-Manager kaum Unterschiede festzustellen sind.

In Deutschland sind die Beitraege fuer die staatliche Sozialversicherung hoeher als in den USA; dort dagegen muss aufgrund des Bundes—und Landessteuersplittings mehr Einkommenssteuer als in Deutschland gezahlt werden. Da die Leistungen der staatlichen und betrieblichen sozialen Absicherung, vor allem der Altersversorgung, in den USA in vielen Faellen nicht so umfangreich sind wie in der Bundesrepublik Deutschland, besteht fuer amerikanische Manager der Zwang, zusaetzlich hohe Privatversicherungsvertraege abzuschliessen. Hierdurch werden ihre Einkuenfte noch weiter geschmaelert. Neben den regulaeren 12-13 (fixen) Grundgehaeltern stellt die Erfolgsbeteiligung einen wichtigen Teil der Jahresgesamtbezuege dar. Sowohl in den USA als auch in Deutschland ist die Mehrheit der Leitenden Angestellten in irgendeiner Form am Unternehmenserfolg beteiligt.

Die Einkuenfte der Spitzenmanager der groessten US-Konzerne liegen zum Teil bedeutend hoeher als die der deutschen Kollegen. Dies liegt jedoch nicht nur an der Dollarhausse, sondern zum ueberwiegenden Teil an den hoeheren variablen Verguetungsanteilen, die in den USA gezahlt werden. Sie betragen dort maximal 70% und in der Bundesrepublik Deutschland maximal 30% der Jahresgesamtbezuege. Im Durchschnitt werden den Fuehrungskraeften in den USA 35% und in der Bundesrepublik Deutschland 20% der Gesamtbezuege in Form einer Erfolgsbeteiligung gewaehrt.

Variable Verguetungselemente trifft man in Deutschland hauptsaechlich in Form von Tantiemen und Praemien an, in den USA dagegen in Form einer jaehrlichen Bonuszahlung oder in Form von Deferred-Profit-Sharing-Systemen. Betriebliche Sozialleistungen zaehlen im allgemeinen nicht zu den fixen bzw. variablen Gehaltsanteilen. Sie werden als Sonderleistung betrachtet.

Mit der Erfolgsbeteiligung soll den Leitenden Angestellten der Beitrag, den sie mit ihren Faehigkeiten und Leistungen zum wirtschaftlichen Erfolg des Unternehmens erbracht haben, honoriert werden. Dabei hat die Praemie als freiwillig gewaehrte und ueblicherweise nach haeufig nicht durchschaubaren und von Jahr zu Jahr geaenderten Kriterien festgelegte Leistung den Nachteil, dass sie das Arbeitsverhalten langfristig nicht auf bestimmte Ziele ausrichtet. Dadurch ist der direkte Bezug zur eigenen Leistung des einzelnen oft nicht gegeben. Die Tantieme aber kann die von der Erfolgsbeteiligung erwartete Leistungsstimulierung bewirken. Die Festlegung einer geeigneten Tantiemebasis ist jedoch nicht unproblematisch. Die zu waehlende Groesse sollte zum einen fuer das gesamte Unternehmen relevant sein, zum anderen jedoch auch in moeglichst enger Beziehung zur individuellen Leistung der Leitenden Angestellten stehen.

Dem deutschen Tantiemesystem entspricht in etwa der sogenannte US-"Bonus". Es handelt sich hierbei um einen kurzfristigen Incentive-Plan, bei dem haeufig die Wahl zwischen Barzahlung und Verguetung durch Aktien bzw. Investment-Anteile besteht. Neben den ueblichen

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kurzfristigen Bonus-bzw. Incentive-Plaenen bestehen in vielen US-Unternehmen sogenannte Deferred-Profit-Sharing-Systeme (Gewinnbeteiligung mit aufgeschobener Auszahlung). Diese Form der Kapitalbeteiligung entspricht in etwa den deutschen Mitarbeiter-Investment-Fonds-Modellen. Der Unterschied zum Barausschuettungsprogramm besteht darin, dass die Mittel einer investiven Verwendung zugefuehrt und den Arbeitnehmern erst zu einem spaeteren Zeitpunkt zur Verfuegung gestellt werden.

Bei Erfuellung bestimmter Voraussetzungen sind diese Modelle steuerbeguenstigt. Die Fonds-Systeme bilden haeufig die Basis der betrieblichen Altersversorgung der US-Unternehmen, d.h. die Mitarbeiter koennen beim Fonds die Gewaehrung einer Rente beantragen, wobei die Moeglichkeit besteht, Rentenzahlungen auf 5, 10 oder 15 Jahre zu verteilen. Es ist natuerlich auch moeglich, sich den Endbetrag nach einer gewissen Zeit auszahlen zu lassen. Mit Profit-Sharing-Systemen werden im uebrigen auch Mittel fuer Lebensversicherungspraemien, Krankheit, Arbeitsunfaehigkeit, Hinterbliebenenversorgung, Arbeitslosigkeitszeiten oder Baukredite angesammelt. 80% der US-Unternehmen haben Pensionssysteme, die auf einer Kombination von Pensions-und Profit-Sharing-Programmen basieren. Inklusive der minimalen staatlichen Rentenleistungen werden jedoch Leitende Angestellte meist nicht mehr als 60% der letzten Festbezuege erreichen. In Deutschland liegt dieser Prozentsatz bei ca. 70%. Da die staatliche Krankenversicherung in USA nur Rentnern und Invaliden die Kosten fuer medizinische Behandlung erstattet, werden haeufig Zusatzkrankenversicherungen und andere Zusatz-und Sozialleistungen mit Hilfe der Fonds oder anderer Systeme finanziert. Aufwendungen der Arbeitgeber fuer betriebliche Altersversorgungssysteme koennen sowohl in den USA als auch in Deutschland als Betriebsausgabe geltend gemacht werden, wenn sie dem jeweiligen Betriebsrentengesetz entsprechen, bzw. in den USA zusaetzlich als "qualified plans" von den Finanzbehoerden genehmigt werden. Die Betriebsrenten koennen in den USA, ebenso wie in der Bundesrepublik Deutschland, auch in Form konventioneller Pensionsplaene, oder auch von Direktversicherungssystemen gewaehrt werden. In den USA geschieht dies ueber Tarifvertraege. In letzter Zeit mehren sich auch in den Vereinigten Staaten die individuellen Pensionszusagen. Konventionelle Zusatzkrankenversicherungsplaene sind in den USA haeufig anzutreffen. Inzwischen besitzen in den USA ca. 80% und in der Bundesrepublik Deutschland ca. 90% der Leitenden Angestellten einen Versorgungsanspruch. Weiterhin haben viele Unternehmen in den USA fuer ihre Leitenden Angestellten Lebensversicherungen ueber durchschnittlich zweimal das Jahresgrundgehalt abgeschlossen.

Unfallversicherungen sind sowohl in den USA als auch in der Bundesrepublik Deutschland stark verbreitet. Die Hoehe der Versicherungssumme bei Tod entspricht im Durchschnitt etwa den jaehrlichen Gesamtbezuegen, bei Invaliditaet verdoppelt sie sich. Sowohl in den USA als auch in der Bundesrepublik Deutschland sind 75% der Fuehrungskraefte durch eine derartige Unfallversicherung abgesichert.

Deutliche Unterschiede gibt es beim Firmenwagen. Im Gegensatz zu deutschen Unternehmen stellen amerikanische Firmen nur selten Autos zur dienstlichen und gleichzeitig privaten Nutzung zur Verfuegung. Der Prozentsatz der Positionsinhaber mit Firmenfahrzeugen ist in USA sehr gering. Schliesslich der Urlaubsanspruch. Er betraegt fuer deutsche Fuehrungskraefte im Durchschnitt 30 Werktage und in den USA durchschnittlich nur 25 Werktage.

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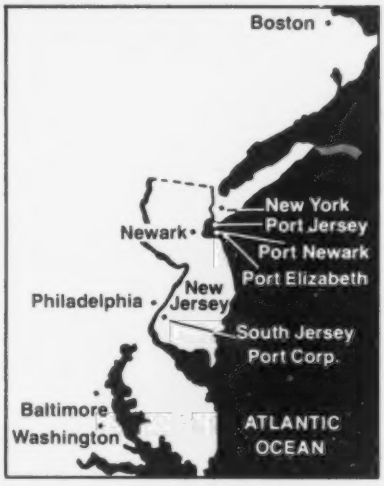

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Technology and Innovation: Prerequisites for German Competitiveness

by Dr. Rolf Rodenstock
President,
Federation of German Industry

The shocks to the world economy as a result of the oil price explosions and the dislocations in the international markets and in international competition produced imbalances and a need for adaptability of hitherto unknown proportions. Created by external and internal events, the increase in inflation, unemployment, rise in foreign debt, and public deficits have, in many countries, developed into an explosive mixture.

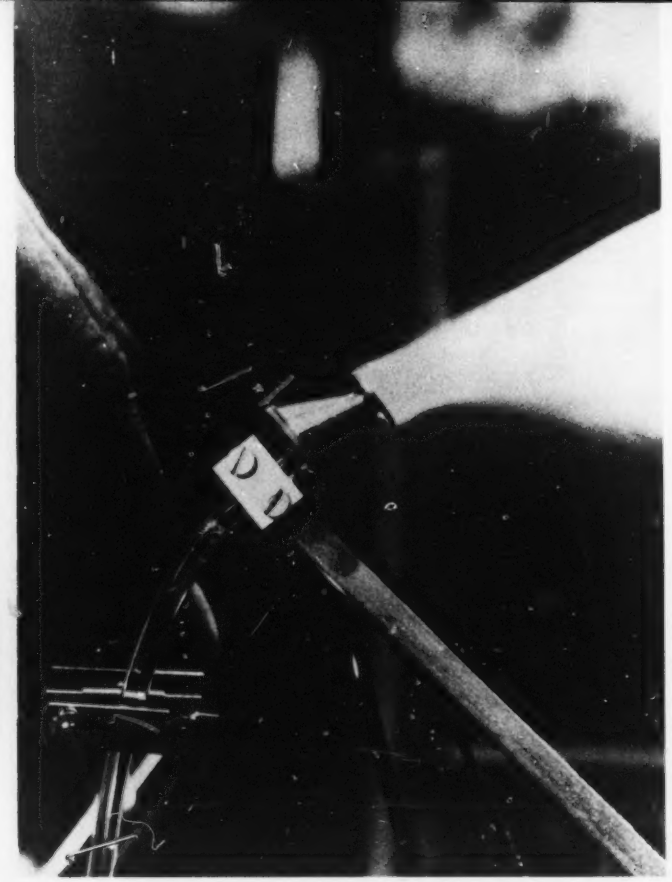
All of this has also touched the German economy. 1980 saw the Federal Republic of Germany confronted with the world's highest deficit in balance of payments, amounting to almost DM 29 billion, compared with DM 10.5 billion in 1979. Judging from present information, 1981 may end with similar results.

The worsening in the balance of payments shows that the Federal Republic of Germany is exposed to structural strains of a kind that we have not known for the past 30 years. The necessary adjustments require that the Germany economy will not only have to come to terms with the challenges of the politics of energy, but will also have to overcome growing competition, especially from Japan and the so-called lesser developed countries.

The strengthening of competitiveness and productivity are, therefore, the central economic tasks that we in the Federal Republic of Germany face in the Eighties. Technical progress plays a key role in this. Only if German industry succeeds in consistently advancing new technologies, by developing products and manufacturing processes of the future, can the necessary conversion processes be mastered.

"The strengthening of competitiveness and productivity are, therefore, the central economic tasks that we in the Federal Republic of Germany face in the Eighties."

A serious bottleneck for future economic development is the energy supply. In order to be able to cover future energy requirements safely and in an economically responsible manner, there must be increased substitution for oil. The considerable success achieved recently in reducing the consumption of oil does not relieve us of the obligation to make great efforts in the future to noticeably



reduce our dependence, especially on oil imports. For this, we need first of all, new techniques of energy production and use.

In this respect, the peaceful use of atomic energy is one of the most decisive innovations of the present day and the most important starting-point for the solution of our energy problems. The development of atomic energy in the Federal Republic of Germany, today, is less an economic or even a technological problem than a social problem and, at the same time, a domestic political question of the highest order, with many irrational aspects.

In the future, all nations will have to make even greater efforts to cover their future energy requirements. All the technological knowledge available to us, therefore, must be drawn upon and used for the development of more advanced and new energy technologies.

Challenges of international competitors

In another respect, too, we face present challenges in politics, science, and economics. In foreign markets, German companies are meeting competition that is efficient in both technology and sales strategy at an international level.

A mere glance at Japanese export efforts shows this quite clearly. Japan, after all, has succeeded in the last year—in spite of a far higher ratio of oil imports to total imports in comparison with the Federal Republic of Germany—in keeping the balance of payments deficit within tolerable limits.

It would be wrong, of course, to reply to the Japanese export offensive with a quota policy. This would be the first step towards a dangerous change in the world's economic structure. Such a step would inevitably be followed by additional protectionist measures, especially since, in the future we must also reckon with increasing competition from other industrial nations, particularly the United States. Even now the foreign trade deficit in respect to the United States amounts to DM 4.2 billion, while in 1978 there was still a plus of DM 2.8 billion. In 1978 we had a foreign trade deficit with Japan of DM 3.7 billion, which by 1980, had already risen to DM 6.5 billion.

The challenges of the Eighties can not be met with resignation and pessimism, nor with protectionism, but only with reflection on economic virtues and on persuasive economic and technological strategies. Among these are

- entrepreneurial readiness to take risks and the capacity for adjustment, mobility, and productivity, and

"In foreign markets, German companies are meeting competition that is efficient in both technology and sales strategy at an international level."

on lots of blue chips.

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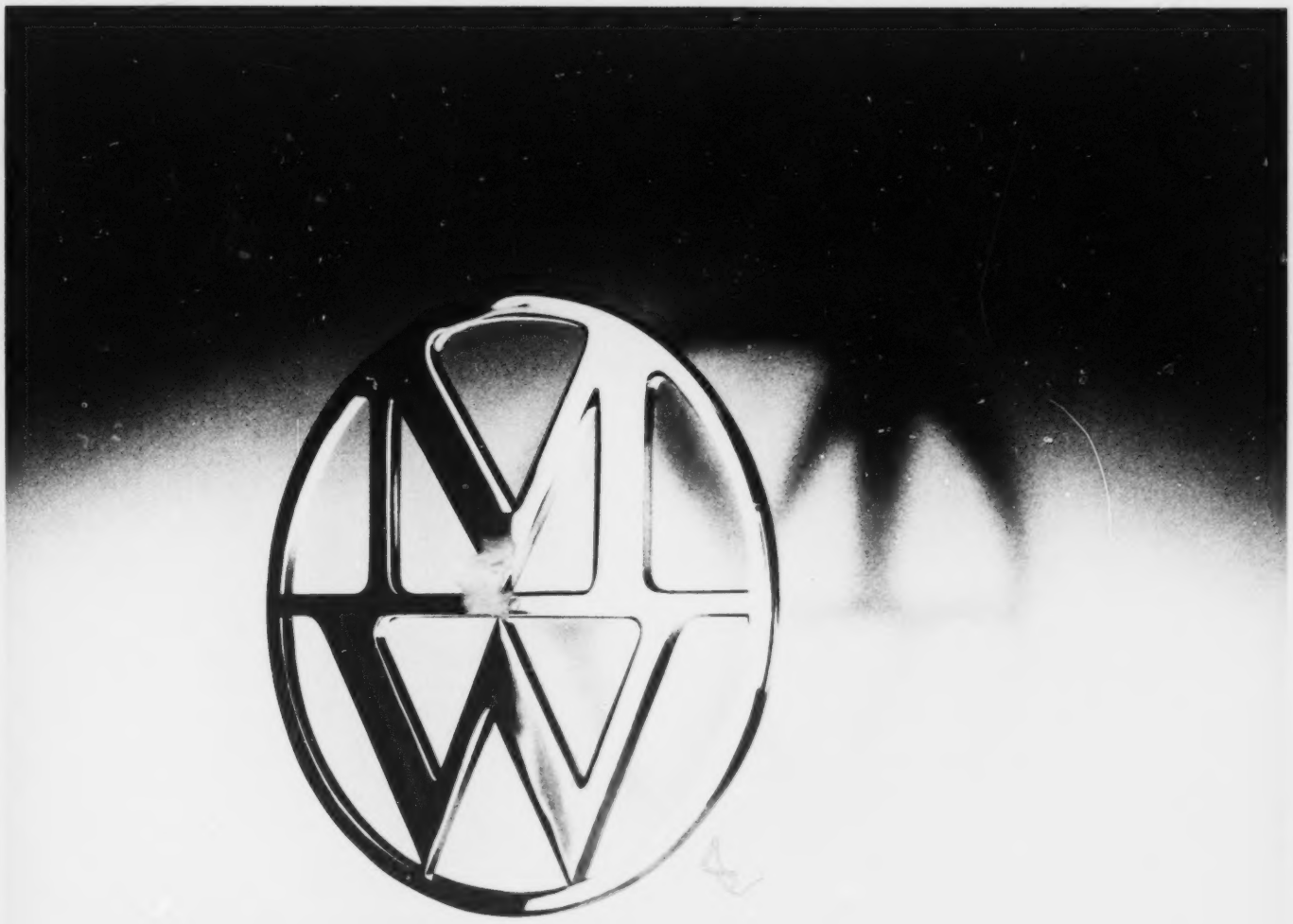

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• the readiness to coordinate economics and politics on the national and, especially, the international level.

Key function of research and development

The strengthening of the power of innovation is the key to the successful shaping of the economic future. This is necessary in several respects. On the one hand, the German economy will be forced to modernize its production apparatus, in order to be able to manufacture more efficiently through the use of new technologies. On the other hand, it must refine its product palette in many areas and restructure it. Along with adjusting supply in the direction of technologically highly developed, so-called "intelligent" products, there have to be improved methods of opening up markets and of assuring markets over the long term. With a country like the Federal Republic of Germany, which is highly developed industrially, but poor in natural resources, it becomes crucially important to further develop technological potential and know-how in areas of the future and of creating new or improved products.

International cooperation

In the field of research and development, too, it is a question of using the particular advantages within the framework of the international division of labor. This is true, first of all, for large technological projects, in which the know-how of various scientific disciplines, as well as the industrial experience of various branches of industry, flow together across national boundaries. In the future, new technologies in communications will make it easier to open up new sources of technical knowledge and to find the desired partners for discussion and cooperation. German industry is open to the exchange of scientific and technical experience within the framework of international cooperation.

The Federal Republic of Germany's economy spends more than DM 22 billion, or about 1.5% of the gross national product, on research and development. This expenditure,which has been increasing from year to year, clearly shows how much effort is going into maintaining and developing the technological and scientific efficiency of the economy. About 200,000 people work in research and development. This large-scale effort is not only true for traditionally research-intensive branches like electrical engineering, chemistry, and mechanical engineering, in which technical innovations

The Federal Republic of Germany's economy spends more than DM 22 billion, or about 1.5% of the gross national product, on research and development, and this expenditure has been growing from year to year.

have always given evidence of the innovative power of German companies. Under the pressure of costs, and in view of the challenges of competitors, the other branches of industry are increasingly making an effort to use research and development for the creation of new products and processes. Even small and medium-sized companies set themselves this "obligation to innovate." These, to some extent, highly specialized companies have increasingly succeeded, on the basis of their ability to adjust to technical developments and new market conditions, in creating worldwide recognition for their new products. It is the small and medium-sized companies in particular that have good chances—using joint research in addition to their own efforts—of playing a substantial role in the shaping of technological development and overcoming structural change.

Thus, the German economy, in its diversity, offers many promising starting-points for international cooperation in the field of research and development.

The infrastructure of innovation

Within the framework of its economic policy, the state must stimulate economic and technological change under clear and reliable conditions, and contribute to increasing the ability and willingness of companies to take risks. It must promote investments in the future, and keep the so-called infrastructure in innovation ready, in order to facilitate the transfer of knowledge between public research institutions, institutions of higher education, and industry, to make the patent system easy to use, and above all, to lay the basis for creative achievements and a continual dynamics of innovation, by means of an efficient educational system oriented according to practical demands. Only through the fruitful cooperation of all those responsible for research and development, will it be possible to meet the national and international demands. Research and development and the carrying out of innovations will play the decisive role in the coming decades. ■

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DEUTSCHE ZUSAMMENFASSUNG

Die Erschuetterungen der Weltwirtschaft durch Oelpreisexplosionen und internationale Markt—und Wettbewerbsverschiebungen haben Ungleichgewichte und Anpassungsdruck von bislang unbekanntem Ausmass erzeugt. Die deutsche Wirtschaft ist von all dem nicht unberuehrt geblieben. 1980 sah sich die Bundesrepublik Deutschland weltweit mit dem hoechsten Defizit in der Leistungsbilanz konfrontiert. Die Verschlechterung der Leistungsbilanz zeigt, dass die Bundesrepublik Deutschland strukturellen Belastungen ausgesetzt ist, wie wir sie in den letzten 30 Jahren nicht gekannt haben. Die notwendigen Anpassungen verlangen von der deutschen Wirtschaft nicht nur ein Fertigwerden mit den energiepolitischen Herausforderungen, sondern auch die Bewaeltigung wachsender Konkurrenz vor allem aus Japan und aus den sogenannten Schwellenlaendern. Die Staerkung der Wettbewerbsfaehigkeit und der Produktivitaet der Wirtschaft sind daher die zentralen wirtschaftspolitischen Aufgaben, vor denen wir in der Bundesrepublik Deutschland in den 80er Jahren stehen. Eine Schluesselrolle spielt dabei der technische Fortschritt. Nur wenn es der deutschen Industrie gelingt, neue Technologien konsequent voranzutreiben, indem sie zukunftstraechtige Produkte und Herstellungsverfahren entwickelt, koennen die erforderlichen Umstellungsprozesse bewaeltigt werden.

Auch in einem anderen Zusammenhang stehen wir vor aktuellen Herausforderungen. Auf den Auslandsmaerkten begegnen die deutschen Unternehmen einer technologisch und absatzstrategisch international leistungsfaehigen Konkurrenz.

Die Herausforderungen der 80er Jahre sind weder durch Resignation und Pessimismus, noch durch Protektionismus, sondern nur durch eine Rueckbesinnung auf wirtschaftliche Tugenden und auf ueberzeugende wirtschaftlich—technische Strategien zu bestehen. Dazu gehoeren:

- *unternehmerische Risikobereitschaft und Faehigkeit zur Anpassung, Mobilitaet und Leistung,*
- *Bereitschaft zur wirtschaftspolitischen Koordinierung auf nationaler und insbesondere auf internationaler Ebene.*

Die Staerkung der Innovationskraft ist der Schluessel fuer die erfolgreiche Gestaltung der wirtschaftlichen Zukunft. Die deutsche Wirtschaft ist gezwungen, ihren Produktionsapparat zu modernisieren, um durch Anwendung neuer Technologien rationeller fertigen zu koennen, und sie muss ihre Produktpalette in vielen Bereichen bereinigen und neu strukturieren. Neben der Bereinigung des Angebots zugunsten technologisch hochentwickelter, sog "intelligenter" Produkte haben verbesserte Methoden der Markterschliessung und der langfristigen Marktsicherung zu treten.

Auch auf dem Gebiet von Forschung und Entwicklung gilt es, die spezifischen Vorteile im Rahmen der internationalen Arbeitsteilung zu nutzen. Dies trifft in erster Linie fuer technologische Grossprojekte zu, bei denen Know-how verschiedener wissenschaftlicher Disziplinen, sowie industrielle Erfahrungen aus verschiedenen Industriezweigen, ueber die Laendergrenzen hinweg zusammenfliessen.

Mit mehr als 22 Mrd. DM gibt die Wirtschaft der Bundesrepublik Deutschland ca. 1,5% des Bruttosozialprodukts fuer Forschung und Entwicklung aus. Die von Jahr zu Jahr zunehmenden Ausgaben zeigen deutlich, mit welcher Anstrengung an der Erhaltung und am Ausbau der technisch-wissenschaftlichen Leistungsfaehigkeit der Wirtschaft gearbeitet wird; ca. 200,000 Menschen sind fuer Forschung und Entwicklung taetig. Dieses grosse Engagement gilt nicht nur fuer traditionell forschungsintensive Branchen wie Elektrotechnik, Chemie und Maschinenbau, in denen schon immer technische Neuerungen Zeugnis von der Innovationskraft deutscher Unternehmen ablegten. Unter dem Druck der Kosten und angesichts der Herausforderung der Wettbewerber sind auch die uebrigen Industriezweige zunehmend bemueht, Forschung und Entwicklung fuer die Schaffung neuer Produkte und Verfahren einzusetzen. Auch kleine und mittelgrosse Unternehmen stellen sich diesem Zwang zur Innovation. Gerade die kleinen und mittleren Unternehmen haben—auch durch gemeinschaftlich betriebene Forschung—gute Chancen, die technische Entwicklung wesentlich mitzugestalten und Beitraege zur Bewaeltigung des strukturellen Wandels zu leisten. Der Staat muss im Rahmen seiner Wirtschaftspolitik durch klare und verlaessliche Rahmenbedingungen den wirtschaftlichen und technischen Wandel stimulieren und dazu beitragen, die Risikofaehigkeit und—bereitschaft der Unternehmen zu erhoehen. Er muss Investitionen in die Zukunft foerdern und die sogenannte Innovationsinfrastruktur bereithalten, um den Wissenstransfer zwischen oeffentlichen Forschungsinstituten, Hochschulen und Industrie zu ermoeglichen, und um das Patentwesen leicht nutzbar zu gestalten. Vor allem muss er durch ein leistungsfaehiges, an den Anforderungen der Praxis orientiertes Bildungswesen die Grundlage fuer schoepferische Leistungen und anhaltende Innovationsdynamik legen. Nur durch ein fruchtbares Zusammenwirken aller fuer Forschung und Entwicklung Verantwortlichen wird es gelingen, den nationalen und internationalen Anforderungen zu entsprechen.

Cologne Trade Fairs '82
Hang on to success

* International **Furniture Fair**	**January 19.—24.**
* **ISM** – International Sweets and Biscuits Fair	**February 1.—4.**
* **DOMOTECHNICA** – International Fair for Household Appliances, Fittings and Components	**February 10.—13.**
* **International Housewares Fair**	**February 11.—14.**
* **International Hardware Fair Tools, Locks + Fittings, D-I-Y Supplies**	**February 13.—16.**
* **International Men's Fashion Week** Cologne together with **International Jeans Fair** Cologne	**February 26.—28.**
* International trade fair **CHILDREN and YOUNG PEOPLE** Cologne	**March 12.—14.**
* **dentechnica 1982** - International Congress & Exhibition for dentists	**April 21.—24.**
* International **Textile Handicrafts** Fair	**April 29.— May 2**
* **IMB** International Trade Fair for Apparel Manufacturing Machinery	**May 18.—22.**
* **Roof + Wall** Building Supply Trade Fair	**June 17.—20.**
* **International Men's Fashion Week** Cologne together with **International Jeans Fair** Cologne	**August 27.—29.**
* **SPOGA** – International Trade Fair of Sport Goods, Camping Equipment and Garden Furniture	**September 4.—7.**
* International **Garden Trade Fair**	**September 5.—7.**
* **IFMA 82** – International Bicycle and Motorcycle Exhibition	**September 18.—20.**
* **Children and Young People** – International Trade Fair	**September 24.—26.**
* **photokina '82** Worlds Fair of Photography Photo-Cine-Audiovision	**October 6.—12.**
* **ORGATECHNIK-Cologne 1982** International Office Trade Fair	**October 26.—31.**

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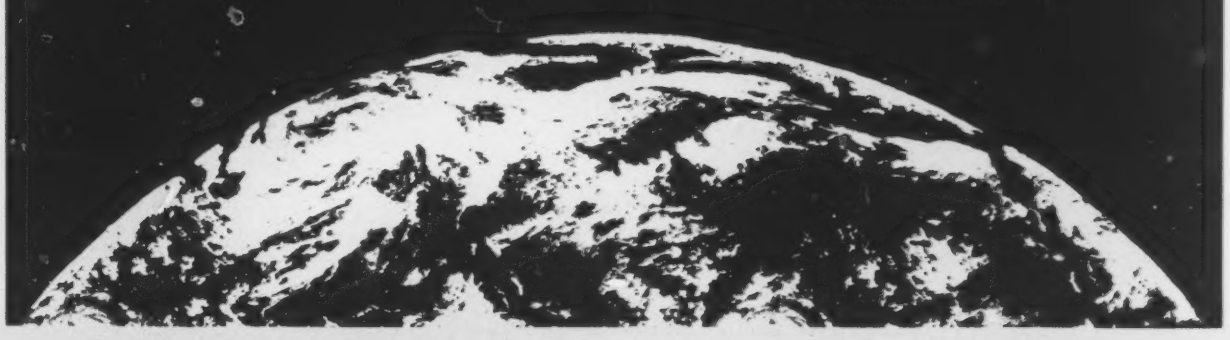

1982 Fair Dates to Remember

Exhibition Cities 1982

Names	Dates
Berlin	
International Green Week Berlin 1982	Jan. 22-31
ITB Berlin 1982 International Tourism-Exchange	Feb. 27-Mar. 3
BERLINER INTERCHIC – Main Sampling –	Apr. 18-21 Oct. 10-13
Medical Congress Berlin 1982 in Conjunction with International Pharmaceutical and Medico-Technical Exhibition	Jun. 1-5
20th Overseas Import Fair "Partners for Progress" Berlin	Sept. 8-12
Cologne	
International Furniture Fair	Jan. 19-24
ISM – International Sweets and Biscuits Fair	Feb. 1-5
DOMOTECHNICA – International Fair for Household Appliances, Fittings and Components	Feb. 10-13
International Housewares Fair	Feb. 11-14
International Hardware Fair – Tools, Locks + Fittings, D-I-Y Supplies	Feb. 13-16
International Men's Fashion Week Cologne together with International Jeans Fair Cologne	Feb. 26-28 Aug. 27-29
International Trade Fair CHILDREN and YOUNG PEOPLE	Mar. 12-14 Sept. 24-26
dentechnica 7th International Congress of Dental Technicians with Trade Exhibition for Dental Laboratories	Apr. 21-24
"handarbeit" International Trade Fair Creative Textile Handicraft	Apr. 29-May 5
IMB – International Clothing Machinery Fair	May 18-22
ROOF & WALL 82 Specialized trade fair for roof, wall and insulation technique in conjunction with the 83rd german roofing contractors congress	Jun. 17-20

Exhibition Cities 1982

Names	Dates
Cologne	
SPOGA – International Trade Fair of Sports Goods, Camping Equipment and Garden Furniture	Sept. 4-7
International Garden Trade Fair	Sept. 5-7
IFMA – International Bicycle and Motor Cycle Exhibition	Sept. 16-20 Trade visitors' days: Sept. 16-17
photokina World's Fair of Photography – Photo – Cine – Audiovision	Oct. 6-10
ORGATECHNIK Cologne 4th International Office Trade Fair	Oct. 26-31
Düsseldorf	
boot '82 – Düsseldorf 13th International Boatshow Düsseldorf	Jan. 23-31
METAV Exhibition of Metal Processing	Feb. 13-17
IGEDO International Fashion Trade Fair *) with IGEDO-DESSOUS Trade Fair for Lingerie, Foundations, Swimwear	Mar. 7-10 Apr. 25-28 Sept. 12-15 Oct. 24-27
GDS International Footwear Trade Fair	Mar. 20-22 Sept. 25-27
DRUPA – 8th International Fair Printing and Paper	Jun. 4-17
hifivideo International Fair with Festival	Aug. 20-26
GLAS International Trade Fair for Industry, Trade and Handicraft. Applications – Machinery – Equipment	Sept. 29-Oct. 2
GIB Industrial Cleaning, Factory Hygiene Maintenance and Repair. International Trade Fair and Congress	Oct. 6-9
hogatec International Trade Fair for Hotels, Restaurant and Catering	Nov. 8-12
INTERBAD International Exhibition of Swimming Pools – Medical Baths – Saunas – Technical Equipment	Nov. 10-14
MEDICA – International Congress and Trade Fair. Diagnostica – Therapeutica – Technica	Nov. 17-20

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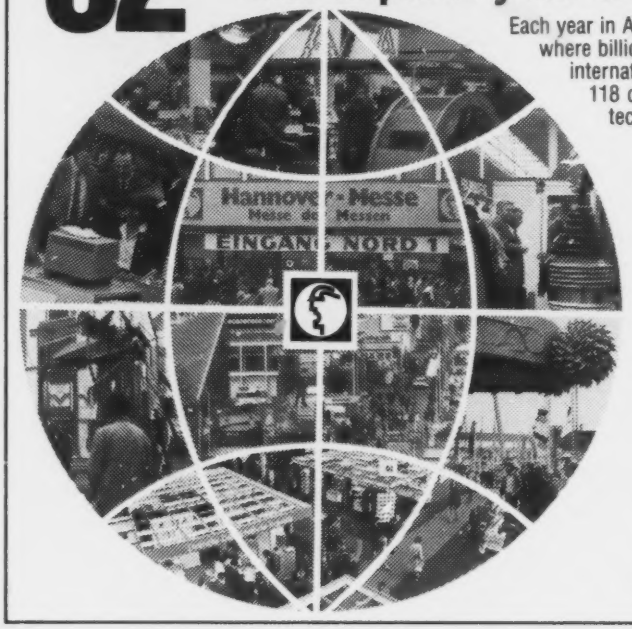

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1982 Fair Dates to Remember

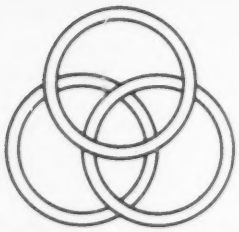
Exhibition Cities 1982

Names	Dates
Frankfurt/M.	
HEIMTEXTIL International Trade Fair for Home and Household Textiles	Jan. 13-17
IMA – International Amusement and Vending Machines Trade Fair	Jan. 21-24
Music Fair Frankfurt – International Trade Fair, Musical Instruments – Orchestral Electronic Equipment – Musical Accessories – Music Publications	Feb. 13-17
Frankfurt International Fair International Trade Fair for Consumer Goods	Feb. 27-Mar. 3 Aug. 28-Sept. 1
International Fur Fair Frankfurt	Apr. 17-21
interstoff – Trade Fair for Clothing Textiles	May 5-7 Nov. 2-5
ACHEMA 82 – 20th Chemical Engineering Exhibition-Congress	Jun. 6-12
automechanica – International Trade Fair for Equipment for Motor Car Workshops and Service Stations, Motor Car Spare Parts and Accessories	Sept. 14-19
Frankfurt Book Fair	Oct. 6-11
HOGA – Trade Exhibition Hotel and Restaurants, Culinary Art, Delicatessen, Fast Food	Oct. 24-28
Hamburg	
InternorGa – International Trade Exhibition for Hotels, Catering, Bakeries and Confectioners	Mar. 12-17
International Exhibition and Congress Ship, Machinery and Marine Technology	Sept. 28-Oct.2
23rd German International Boat Show with EMTEC Trade Days	Oct. 21-31
Hanover	
CONSTRUCTA The Building Trade Fair	Feb. 3-10
didacta 82 19th International Trade Fair for Schools, Education and Training	Mar. 8-12
Hanover Fair	Apr. 21-28
FAB – Trade Exhibition for Hospital Equipment	May 11-14
International Aerospace Exhibition Hanover – ILA	May 18-25

Exhibition Cities 1982

Names	Dates
Munich	
INHORGENTA International Trade Fair for Watches, Clocks, Jewellery, Precious Stones and Silverware with their Manufacturing Equipments	Feb. 13-16
ISPO International Sports Equipment Fair	Feb. 25-28 Sept. 9-12
IHM 34th International Light Industries and Handicrafts Fair. The Fair for small and medium-sized Enterprises	Mar. 13-21
MODE-WOCHE-MÜNCHEN International Fashion Fair	Mar. 28-31 Oct. 3-6
ANALYTICA International Exhibition with Conference International	Apr. 27-30
COSMETICS International Trade Fair for Cosmetics, Health and Beauty Care	May 7-9
57th DLG-Exhibition International Agricultural Show	May 20-26
TRANSPORT Goods and passenger transport systems – today and tomorrow International Trade Fair with Congress, Meetings and Info-Market	Jun. 15-19
INTERFORST International Trade Fair for Forestry and Timber Technology with International Congress and Special Shows	Jun. 29-Jul. 7
IKOFA International Trade Fair of the Food Industry	Sept. 21-26
Ceramitec International Exhibition of Machinery, Equipment, Plant and Raw Materials for the Ceramic Industry with Congress	Oct. 19-23
electronica International Trade Fair for Components and Assemblies in Electronics	Nov. 9-13

PRODUCTS FOR INDUSTRY FROM FRIED. KRUPP GMBH



KRUPP INTERNATIONAL, INC.

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KRUPP INDUSTRIE- und STAHLBAU DIVISION

550 MAMARONECK AVENUE, HARRISON, NEW YORK 10528 · TELEPHONE: (914) 381-2000

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KRUPP MaK DIESEL INC.

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Company Profiles

PROFILES

ABD Securities Corporation

Founded in 1968, ABD SECURITIES CORPORATION is an American investment banking firm with corporate headquarters in New York, and regional offices in Boston, Chicago and Los Angeles. It was one of the first foreign-owned investment firms established in the United States. Two major European banks—Dresdner Bank AG and Bayerische Hypotheken-und-Wechsel-Bank AG share the common stock of ABD.

ABD employs about 90 professionals and staff employees in all areas of the investment banking business.

ABD serves the financial needs of European and other international corporate, institutional and individual investors who wish to purchase American securities, obtain American capital financing or operate in the United States and also serves American investors with similar objectives in foreign markets.

Its extensive range of coordinated financial services include institutional services and trading; investment information and research; portfolio management for individuals and institutions; underwriting and international corporate finance.

ABD's primary objective is to service the unique requirements of each client...no matter how specialized those needs may be. Its various divisions consistently coordinate their efforts toward a single goal: superior long-term investment results.

The Corporate Finance Division can create investment opportunities for multinational companies or those who intend to become international. It offers a complete spectrum of investment banking services, and has completed numerous transactions in three primary corporate finance areas: establishing a subsidiary of a joint venture; formulating mergers, acquisitions and tender offers; and raising long-term capital.

It can provide valuable assistance to foreign or American companies interested in establishing or expanding international operations. ABD can help create a business structure or a joint venture suited to the market; determine the most logical location for a new plant; obtain financing, and negotiate the lease or purchase of real estate.

ABD's Portfolio Management Department offers investment counseling and fund management services for both institutional and individual investors including discretionary management, advisory management, and all depository functions including safekeeping of securities, collection and payment of income, and other special services as required by individual and institutional clients. Financial reporting may be adapted to meet varying specific legal requirements. All client accounts are included in a regular monthly review and reporting system.

ABD owns memberships on major United States stock exchanges and combined with its long-standing European relationships and other foreign market contacts, possesses numerous outlets for large block transactions—and can assure institutional and individual investors fast and efficient execution of their orders.

ABD is an important underwriter for public offerings made by major corporations in the United States and in foreign markets, and also serves as Broker/Dealers on numerous equity markets in the Western World; and provides trading, execution and clearance functions for institutional and private clients—on a worldwide basis.

AEG-TELEFUNKEN

AEG-TELEFUNKEN is one of the largest electrical manufacturers in the world, occupying a leading position in important areas of the capital goods, systems technology and consumer goods business. The Group sales in 1980 amounted to DM 14.7 billion after DM 14.2 billion in 1979. Foreign sales amounted to approximately DM 6.2 billion. The proportion of foreign sales in the year under review thus amounts to 42%. Sales to Western European countries predominate (67%), followed by America (15%).

If the world-wide sales are divided up by sectors, we obtain the following picture from January 1, 1981:

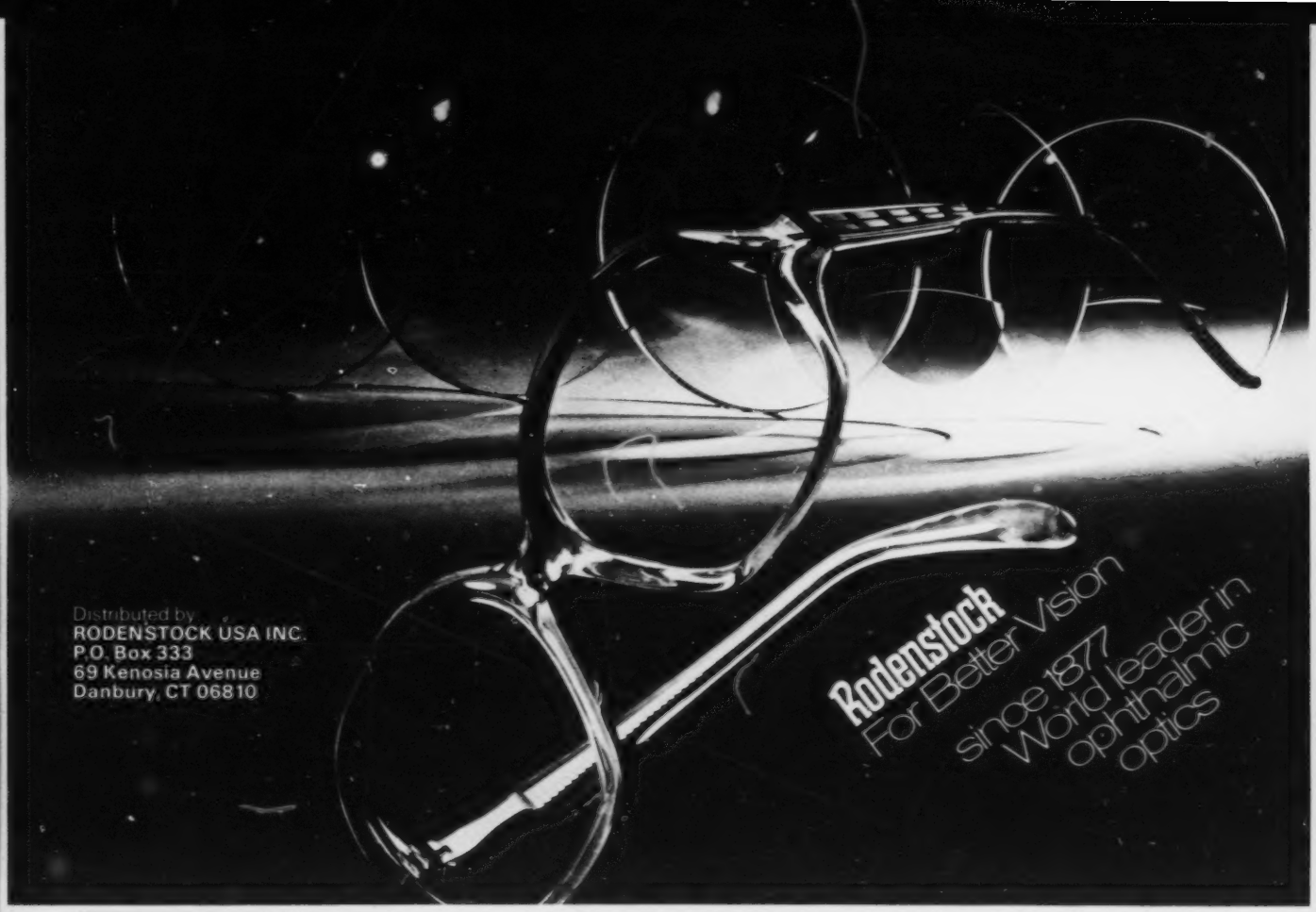
Systems	38%
Communications systems	5%
Standard products	16%
Household appliances	22%
Consumer electronics	12%
Office equipment	7%

The orders received by AEG-TELEFUNKEN world-wide rose from DM 14.2 billion in 1979 to DM 14.7 billion in the year under review. In the capital goods sectors total orders received were 8% higher than in the previous year. AEG-TELEFUNKEN Germany employed 108,400 persons at the end of 1980, AEG-TELEFUNKEN abroad 29,700 persons (world-wide 138,100 employees). More than 9,000 employees work in the research institutes in Berlin, Frankfurt/M. and Ulm, in special institutes and in numerous development laboratories.

Investments in fixed assets amounted to DM 503 million and exceeded the figure for the previous year by 28%. 87% of investments in fixed assets were in Germany and were mainly for rationalizing and modernizing plant. The investments abroad rose by 45% in the year under review to DM 68 million. The financial investments are almost entirely abroad and include in particular the 25% acquisition of shares in MODULAR COMPUTERS SYSTEMS Inc. (MODCOMP), Fort Lauderdale/USA,and increases in the capital of the foreign subsidiaries. In the scope of global business AEG-TELEFUNKEN is represented in 154 countries.

Allianz

ALLIANZ INSURANCE COMPANY (AIC), with headquarters in Los Angeles, California, is an affiliate of Allianz Versicherungs-AG of Munich—the largest insurance group in Europe. With an overall direct premium volume of more than $11.628 billion, the Allianz family ranks among the ten largest in the world. Its California-based affiliate provides full underwriting facilities in North America, and especially for German-linked trans-Atlantic risks.



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ABD Securities Corporation

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Shareholders: Dresdner Bank/Dresdner Bank AG • Hypo Bank/Bayerische Hypotheken-und Wechsel-Bank AG

AIC, along with its other U.S.-based Property/Casualty affiliates, is a growing concern, with assets of almost $178 million. The group offers a broad range of commercial insurance coverage which spans all principal lines of business, including general liability, workers compensation, commercial auto, property, inland and ocean marine, and technical coverage in the areas of boiler and machinery, and builders' risk.

The U.S.-based facilities are further complemented by a direct AIC subsidiary, Allianz Underwriters, Inc., which is active in the excess and surplus lines marketplace, and by Allianz Intermediaries Surplus Line Brokers, Inc. which has facilities for wholesale brokerage placements throughout the U.S. and London markets. Allianz Underwriters, Inc., and Allianz Intermediaries are also headquartered in Los Angeles.

Allianz Syndicate, Inc., and Allianz Management Co. constitute additional Property/Casualty facilities which operate through the newly established New York Insurance Exchange, and they serve to round out an increasingly formidable Allianz presence in the U.S. Property/Casualty marketplace.

All U.S.-based Property/Casualty operations are under the common leadership of Mr. Frank E. Raab, a thirty-five year veteran of the American Property/Casualty industry. Mr. Raab is President and Chief Executive Officer of AIC, and is Chairman of the Board of Directors, as well, of each concern.

As noted, a central emphasis for Allianz's American venture is to service the transatlantic needs of German-linked risks, and particularly the existing clientele of Allianz Versicherungs-AG. For this purpose a separate unit has been established within the Home Office of AIC, staffed with highly qualified professionals who have strong contacts and credentials in this field. Mr. Herbert Hansmeyer, an AIC Vice President, is responsible for heading up this German-link Department.

"Allianz"has been a byword for pioneering innovation in the Property/Casualty marketplace—particularly in commercial lines such as engineering (technical) insurance. An independent scientific foundation supported by Allianz conducts internationally acclaimed research in the loss prevention field, particularly with regard to industrial and automobile risks.

Allianz's entry into the U.S. has included the 1979 acquisition of two sizable life insurance companies—Fidelity Union Life Insurance Company of Dallas, Texas and North American Life & Casualty Company of Minneapolis, Minnesota.

This broad-based debut into the U.S. insurance marketplace is part of a program of worldwide diversification and growth which has included the establishment of affiliates in Brazil, Egypt, Saudi Arabia, Indonesia, Venezuela, South Africa and Australia.

AMERICAN HOECHST CORPORATION (AHC) with headquarters in Somerville, New Jersey has moved into the billionaire sales class two years ago. In 1980, sales reached $1.29 billion, a 15 per cent increase over 1979 sales.

AHC is now in its 27th year. It started business in the USA in 1953 with sales of $1 million.

In 1980, due to the generally weak economy, high interest costs, start-up costs for a $180 million petrochemical/plastic plant, and increased expenditures for research, American Hoechst recorded a loss of $10 million. During 1980, expenditures for research and development alone were increased by $10 million to $51 million or 25 per cent over 1979's $41 million.

American Hoechst's strategy puts priority on investing today for long-term profit rather than emphasizing quick profits. About half the research investment is spent in the health care field which is slowly beginning to pay off. Hoechst-Roussel Pharmaceuticals, Inc., a subsidiary, received in early 1981 approval from the U.S. Food and Drug Administration to market in the United States the first of the third generation cephalosporin antibiotics. Applications for five more drugs are pending and more than a dozen important drugs are under development.

All the company's divisions achieved significant sales increases in 1980: Film Division sales rose 56 per cent; Animal Health up 28 per cent; Plastics Division up 12 per cent; Petrochemicals Division up 14 per cent; Fibers Divisions up 12 per cent; Azoplate Division up 21 per cent; Industrial Chemicals Division up 6 per cent; Hoechst-Roussel Pharmaceuticals, Inc. up 6 per cent. In the fields of Agricultural Chemicals, the company introduced in 1980 its first herbicide in the USA.

For 1981, American Hoechst expects to increase sales by approximately 19 per cent to $1.54 billion.

ANKER

ANKER KOLEN MAATSCHAPPIJ was founded as an international coal trading and distribution company some 60 years ago in Rotterdam.

In 1974, the company expanded into the United States by opening a New York office then known as Anker Trading S.A. Within a year, developments in the coal industry led Anker into the mining business as well. And Anker Mining and Development Company was formed and located in Pittsburgh with overall responsibility for mining operations conducted by several affiliated companies.

Anker now produces more than 2 million tons of coal in the United States each year—of which about half is exported. And in addition to the coal the company mined itself, Anker Energy Corporation (formerly Anker Trading S.A.) exported another 2 million tons produced by other U.S. firms last year.

Overall in 1980, Anker Kolen Maatschappij traded about 5 million tons of coal throughout Europe from sources including Australia, China, Morocco, South Africa, and the U.S.

ARTHUR ANDERSEN & CO

SOCIETE COOPERATIVE

ARTHUR ANDERSEN & CO. is one of the largest international accounting firms, providing a full range of professional services in accounting and auditing matters, tax compliance and planning, and management information consulting to more than 75,000 clients.

Since its founding in 1913, a guiding principle of Arthur Andersen & Co. has been its one-firm concept, which assures that all partners have a similar interest in serving all the firm's clients everywhere in the world. In keeping with this tradition, the firm in 1978 created a Société Coopérative, domiciled in Geneva, Switzerland, to coordinate its worldwide services. This S.C., which is controlled by all the partners in the firm's practice offices, assures consistently high quality of professional practices and standards of client service.

To fulfill its commitment to excellence, the firm has established and maintains an intricate communications network which provides for rapid sharing of new information and recent experiences and facilitates consultation and research.

Continuing professional training and development are emphasized, using the most modern facilities and techniques available. In addition, the quality of performance and service is effectively monitored through a world-wide quality assurance program.

Accounting and Auditing—Arthur Andersen & Co. has always taken a business approach to its audit assignments and specialized accounting services. All its professional personnel are trained first to develop an understanding of the client's business and operating objectives. Recommendations regarding management systems are developed within this framework. Combining this business approach with the one-firm concept, the firm renders specialized assistance in the accounting and financial aspects of seeking and evaluating potential acquisitions, locating plants and other facilities, and making other contractual relationships.

Tax Services—The firm's tax practice is conducted by the world's largest non-governmental body of full time tax professionals. Tax personnel in each office are expert in local tax matters as well as important concepts of international tax planning and the intricacies of international tax treaties. Through its sharing of experience, its communications network and worldwide research facilities, the firm offers fully integrated tax advice on such matters as organization structure, cross-border trading, transnational acquisitions, mergers and other undertakings. Similarly it is well positioned to assist expatriates in their individual tax planning and compliance.

Management Information Consulting
For more than 35 years Arthur Andersen & Co. has helped clients meet their business information needs. The Management Information Consulting Division has grown into the largest international systems and consulting organization of its kind, with some 4,300 professionals in 40 countries. The division's professional personnel design and install information systems and conduct analytical studies to provide the information executives need to effectively plan, evaluate and control their financial, marketing, information processing and other operations.

Atlantic Capital Corporation

ATLANTIC CAPITAL CORPORATION, originally established in 1970, is a U.S. investment banking firm, wholly owned by Deutsche Bank AG. Atlantic Capital employs about 90 professionals and staff employees.

The corporate finance activities of Atlantic Capital include: the management of debt and equity public security offerings in the U.S. and international markets; the private placement of debt securities with U.S. and non-U.S. institutional investors; advising European companies in making acquisitions of U.S. companies; specialized corporate financings, such as tax-exempt Industrial Revenue Bonds and Pollution Control Bonds to finance plant and equipment in the U.S.; lease and currency hedge financing and financial advisory services, especially in connection with corporate acquisitions in the United States.

In the last five years Atlantic Capital has managed or co-managed well over 150 different transactions including U.S. private placements, public offerings, Industrial Revenue Bond offerings, Pollution Control financings, lease financings and Euro-bond financings. In addition, the firm served as a financial advisor to numerous European companies which made acquisitions of U.S. public and privately owned corporations.

The underwriting activities of Atlantic Capital consist of participations in most domestic and international syndicates, formed for the distribution of securities. In the past 12 months Atlantic Capital participated in over 375 public offerings, underwriting a total of approximately 335 million dollars. These commitments were placed with financial institutions around the world.

The Stock Trading Department makes a market, trades as principal, and has an important agency order execution capability in American securities. In addition, the firm is a registered third market maker in approximately 120 U.S. stocks. The firm is a member of most regional exchanges.

The Bond Trading Department makes active markets in U.S. domestic debt securities with special emphasis on "Yankee Bonds" and "Eurobonds," dealing with a broad range of institutional investors, who are serviced by a special bond sales group.

The firm's Money Management Services cater to private and institutional clients desiring to have their assets managed and supervised in New York on a discretionary basis.

The International Department markets non-U.S. dollar instruments, especially those denominated in Deutsche Marks, to institutional clients who seek international portfolio diversification.

ACL

ATLANTIC CONTAINER LINE is an international company formed by six major European shipping lines to provide a complete through-transport service between Europe and North America.

The company began with the idea of building a fleet of large and fast roll-on/roll-off cargo vessels for transatlantic service. To that end, three Swedish Companies joined together in 1965 to meet the high capital investment involved in developing, building and operating such a venture. These companies included Wallenius, the world's largest sea carrier of motor cars; the Swedish American Line and the Transatlantic Steamship Company Limited; and the Holland America Line of Rotterdam. They were later joined by the French Compagnie Generale Transatlantique (CGT) and the British Cunard Steamship Company.

A technical committee with representatives from all these partner companies was organized to begin design and construction of the ACL fleet. While containerization would form an important part of the service, they recognized from the start that shippers would need cargo handling and carrying capacity for goods that could not be containerized and for goods that could be handled better and more efficiently by not being containerized. Their solution: a combined roll-on/roll-off container fleet that provided a fast, efficient, and economically attractive general cargo service including transport of cars. This fleet was ready for launch in 1967, and ACL introduced RO/RO service to the U.S. and North Atlantic trade.

Meanwhile growth and changes continued. In 1974, Holland America Line changed hands, as did its share in ACL. Today it is now owned by Inter-continental Transport (ICT)BV, the Dutch subsidiary of the Brostrom Group of Sweden. A further development occurred in 1976 when the three vessels of Car Line—owned by CGT, SAL and Wallenius became fully integrated into the ACL fleet.

Today ACL is owned by Compagnie Generale Maritime (CGM) of France; The Cunard Steamship Company Limited, of Great Britain; Intercontinental Transport (ICT) BV of the Netherlands; Swedish American Line of Sweden; and Walleniusrederierna of Sweden.

It currently operates 14 fast modern RO/RO container ships direct from the United States East Coast to eight major ports in the United Kingdom, France, the Netherlands, Belgium, West Germany and Scandinavia. With rapid load and unload capacities, ACL's vessels offer eight to

twelve hour turn-around and three-times-a-week sailings from U.S.ports. The company now handles more cargo than anyone else on the North Atlantic.

AVIS

AVIS, INC. a recognized leader in the car rental industry, has worldwide interests in car and truck rental and leasing, vehicle retail sales, luxury car rentals, chauffeur drive service and car park operation and management.

The company was founded in 1946 by Warren E. Avis who became convinced of the post-war need for airport car rental while flying during World War II as a U.S. Air Force officer. When he formed Avis Airlines Rent A Car System at Willow Run Airport near Detroit, it was the world's first airport car rental service.

Today, the Avis system operates in more than 100 countries from approximately 3,500 locations, including about 1,200 airports. Its total fleet, worldwide, is approximately 250,000 with a Rent A Car fleet of 118,000 cars.

The company is readily identified by its world-famous "We try harder " slogan. The line was developed in 1963 as part of a publicity campaign which honestly admitted that Avis at the time was 'only' Number Two in car rentals. Avis made a virtue of its position by claiming to "try harder." Over the years, Avis has provided a demonstrable quality of service to its customers which underscores an ongoing and company-wide commitment to its "Try Harder" philosophy.

Since the summer of 1977, Avis, Inc. (of which Avis Rent A Car System, Inc. is a wholly-owned subsidiary) has been owned by Norton Simon Inc., an American holding company whose operating companies are manufacturers and marketers in the foods, cosmetics, fashion, wines, distilled spirits and packaging fields. Norton Simon Inc. operating companies include — in addition to Avis — Hunt-Wesson, Max Factor, Orlane, Somerset Importers, McCall Patterns, Glass Containers, United Can, and Halston Enterprises.

Globally, Avis employs more than 14,000 people, including over 300 permanent employees at its Worldwide Reservations Center in Tulsa, Oklahoma (Tel. 1-800-331-1212). World Headquarters is located in Garden City, New York (Tel. 516-222-3000).

BHF-BANK

BERLINER HANDELS- UND FRANKFURTER BANK

While the story of BHF-BANK dates back to the middle of the last century, its present status results from a merger between Berliner Handels-Gesellschaft and Frankfurter Bank. As a limited Company (KGaA), the Bank is owned by shareholders and is directed by its personally liable Managing Partners. It is a commercial bank and issuing house, is involved in portfolio management and securities business, and has been active in international finance for more than one hundred years. The Bank thus combines the advantages of a company that has access to the capital market, with all the flexibility of a private bank.

Headquartered in Frankfurt, BHF-Bank serves a broad and diversified clientele: industrial companies (including nine out of ten top German companies), multinational corporations, government agencies, public entities, international organizations, and financial institutions as well as private customers.

Through its own foreign branches, subsidiaries, representative offices and membership in the Inter-Alpha Group of Banks, BHF-Bank is well positioned to provide its clients with individually packaged financing wherever the need arises: in Europe, in North and South America, in the Middle East, in Africa, in Southeast Asia, and in the Far East.

BHF-Bank International, Luxembourg, affords direct access to the Euromarket and, together with BHF-Bank's branches in New York and the Cayman Islands, gives the Group the facilities and flexibility to tap the Euro-currency and Euro-capital markets in both the European and North American time zones.

As a result of its traditional involvement with large companies engaged in foreign trade, BHF-Bank is exceptionally well versed in the nuances of international commercial banking—from routine transactions to the most complex financial packages. The Bank concentrates its creative skills on wholesale banking activities, principally for larger companies. Through the years, its proven ability to tailor its facilities to meet the most stringent requirements of its clients, and its commitment to efficiency and good service have contributed substantially to the successful development of German and international companies, as well as subsidiaries of multinational corporations operating in Germany.

BMW

Steady growth and enthusiastic product acceptance mark the history of BMW OF NORTH AMERICA, INC., since it became responsible for importing and marketing Bavarian Motor Works automobiles in March, 1975.

Since then, automobile sales have increased from an annual rate of 14,000 to 37,000 in 1980. The national BMW dealer organization has grown to 370 and sales-per-dealer now total 100, an increase of 70 percent from the 1975 rate.

The company's growth continued in 1980 as it assumed responsibility for importing and marketing BMW motorcycles through a nationwide network of 240 dealers. The company also established an emission control laboratory at its Western region headquarters in Los Angeles.

BMW's 1981 model range—a two-door, four-cylinder sedan, the 320i; two four-door, six-cylinder sedans, the 528i and 733i; and a limited production sports coupe, the 633CSi—is designed to appeal to a specific segment of the driving public. The BMW driver is one who seeks a sporty and exhilarating driving experience and appreciates a machine of high technical quality and functionality.

Fuel economy became a major consideration for BMW's 1981 models, and BMW engineers responded with a model lineup expected to yield a 30 percent improvement in the company's CAFE rating for the model year.

1981 marks BMW of North America's third year in the American marine market. As part of the company's Allied Products Group, BMW Marine offers 12 engines, including diesel auxiliaries of 7, 12, 35, and 50 horsepower, inboard and stern-drive gasoline engines of 130, 190, and 220 horsepower.

The Allied Products Group is also responsible for automobile parts; sales, service, and parts for BMW Marine products; and development and distribution of a line of special automotive-related merchandise and "lifestyle" accessories, under the name, "Ultimates by BMW."

BMW of North America is headquartered in Montvale, N.J., while the newly formed motorcycle group is housed in nearby Norwood, N.J. Three regional offices are located in Los Angeles, Dallas and Schaumburg, Illinois. John A. Cook is president of the company, which has more than 525 employees nationwide.

If Hamburg Has A Secret...

...it's all over the streets!

Goodwill Street

Hamburg has a great world port. You know that, of course.

But when you do business in Hamburg, you suddenly discover much more. It's no secret. Even our street names give it away:

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HAMBURG

Feb. 13-21, 1982	**Leisure '82/Holidays '82** together with Garden '82, Do-it-yourself '82, Hobby '82 and SBB '82 (do-it-yourself Boat Show)
March 12-17, 1982	**Internorga** International Trade Exhibition for Hotels, Catering, Bakeries and Confectioners.
March 25-28, 1982	**International Orchid Exhibition** in conjunction with the 6th European Convention on Orchids.
July 1-4, 1982	**Interflora** Trade Exhibition and Flower Show in conjunction with Interflora World Congress
Aug. 17-24, 1982	**Electron Microscopy** Exhibition in conjunction with the 10th International Congress on Electron Microscopy.
Sept. 28-Oct. 2, 1982	**SMM '82** Exhibition in conjunction with Convention "Ship, Machinery and Marine Technology '82."
Oct. 21-22, 1982	**EMTEC Trade Days** European Marine Trade Exhibition (Boating)
Oct. 23-31, 1982	**German International Boat Show**

Hans J. Rathje, Inter-View Communications, Inc.
545 Madison Ave., New York, N.Y. 10022
Tel.: (212) 758-4651

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666 Fifth Avenue, New York, N.Y. 10019
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TRADE FAIRS · CONGRESSES + TRADE FAIRS · TRADE FAIRS + CONGRESSES

BfG Bank für Gemeinwirtschaft

BANK FUER GEMEINWIRTSCHAFT AKTIENGESELLSCHAFT (BfG), with headquarters in Frankfurt/Main, is one of the Federal Republic of Germany's major credit institutions. With a total staff of approx. 7,000, the bank offers its services at over 250 branches and agencies in all important towns and cities in the Federal Republic and West Berlin.

BfG's principal shareholder is the Beteiligungsgesellschaft fuer Gemeinwirtschaft AG (BGAG). This holding company was established in 1974, and 99.4% of its share capital is held by the German Trade Unions' Federation and its individual member unions. Bank fuer Arbeit und Wirtschaft AG, Vienna, Austria, holds the remaining token amount of shares.

BfG has been very successful with its concept of operation as an all-purpose bank offering its services on a broad sphere. Its total assets were DM43.4 billion at the end of 1980, whilst the balance sheet total of the BfG Group amounted to DM60.5 billion. Customers' deposits totalled DM22.6 billion, with lendings to customers amounting to DM22.3 billion. The bank makes loans available to all sectors of the economy and includes among its borrowers public authorities as well as private households and enterprises from all branches of industry. The bank's project loans of up to DM1,000,000 with a maximum term of 15 years are specially designed for small and medium-sized enterprises for numerous types of capital projects.

1980 also saw borrowers abroad making wide use of the credit facilities provided by BfG, whose international business is enhanced by the activities of its branches in London, New York, and Cayman Islands; as well as its representative offices in Hong Kong and Sao Paulo. BfG's other footholds abroad include two wholly-owned subsidiaries: BfG: Luxembourg S.A.; and BfG: Finance Asia Limited, Hong Kong, which was established in 1980. The bank also has holdings in International Cooperative Bank Co. Ltd., Basel; Hollandse Koopmansbank N.V., Amsterdam; and Israel Continental Bank Ltd., Tel Aviv.

BANKERS TRUST COMPANY was founded in 1903 as a trust company and over the years has developed into the country's eighth largest commercial bank.

In 1978, Bankers Trust adopted a new corporate strategy which emphasized the bank's relationships with corporations, financial institutions, governments and affluent individuals worldwide. As part of this strategy to focus on wholesale banking, Bankers Trust Company sold 80 of its consumer branches during 1980 but will retain a core group of 15 offices in New York City.

The bank's involvement in international banking began in 1920 when it opened a branch office in Paris, and two years later the London office was opened. Bankers Trust Company now has branches in London, Paris, Madrid, Milan, Birmingham, Jersey, Manila, Manama, Nassau, Panama City, Seoul, Singapore and Tokyo and affiliates and representative offices in more than 30 countries.

The bank is a member of Bankers Trust New York Corporation, a multi-bank holding company, formed in 1966. Other member banks include Bankers Trust Company of Albany, N.A., Bankers Trust Hudson Valley, N.A., Bankers Trust Company of Western New York and Farmers National Bank of Malone. BT Leasing Services, Inc., BT Credit Co., Inc. and BT Capital Corporation are affiliates of the Corporation.

The pyramid atop the Bankers Trust Company office at 16 Wall Street has become the bank's trademark.

HYPOBANK
BAYERISCHE HYPOTHEKEN- UND WECHSEL-BANK AKTIENGESELLSCHAFT

BAYERISCHE HYPOTHEKEN-UND WECHSEL-BANK was established in 1835 in Munich by royal decree of King Ludwig I of Bavaria. HYPO-BANK is Germany's oldest publicly-owned corporate banking institution and one of the largest, with consolidated assets of close to DM 84 billion.

HYPO-BANK engages in both commercial and mortgage business, operates the largest branch network in southern Germany, and is also active nationwide in key centers, such as Frankfurt, Hamburg, Hannover, Duesseldorf, Stuttgart and Berlin. Through its wholesale full-service branches in New York, Cayman Islands and London, its subsidiaries in Luxembourg and Salzburg, representative offices in Australia, Brasil, Mexico, South Africa and Spain, affiliates and its partnership in ABECOR, Europe's largest international banking group, HYPO-BANK offers worldwide services. Via its affiliation with ABD Securities, New York, its customers have direct access to the U.S. securities market.

FINANCIAL HIGHLIGHTS OF 1980

PARENT BANK	1980 DM millions
Total Assets	57,320
Shareholders' Equity	1,776
Due to Customers	21,081
Including Savings Deposits	8,537
Due from Customers	19,540
*Bonds Outstanding	23,180
Mortgage Banking Division Loans	20,414
Employees	11,252
Branches	495
Dividend per Share at DM 50 par Value	7

CONSOLIDATED DATA	
Total Assets	83,846
Due to Customers	23,501
Due from Customers	24,291
*Bonds Outstanding	38,342
Mortgage Banking Division Loans	35,765
Employees	12,167

*Including delivery commitments and borrowings in the mortgage banking division as well as bearers' debentures in the general banking division.

Bayerische Landesbank Girozentrale

Size:
Among the top 5 banks in Germany.
Service Spectrum:
Commercial and investment banking embracing the full gamut of domestic and international financial services.
Central Office:
Munich, West Germany
International Presence:
Luxembourg—wholly-owned subsidiary (Bayernlux);
London, New York and Singapore—full-service branches;
Nordic countries—Deutsch-Skandinavische Bank (50% holding);
Johannesburg, New York, Toronto, Vienna—Representative offices

BAYERISCHE LANDESBANK traces its beginnings to the late nineteenth century with the establishment of a state financial institution (Landesbodenkreditanstalt)

whose primary function was public sector financing within Bavaria. With the emergence of the Sparkassen another major bank was founded—Bayerische Gemeindebank—which served as central banker and liquidity manager for the regional Sparkassen. In time, Bayerische Gemeindebank developed into a full-fledged commercial bank. These financial institutions were the mainsprings for further expansion into all banking areas after the two institutions merged to form Bayerische Landesbank Girozentrale in 1972.

The founder-owners of Bayerische Landesbank were the State of Bavaria and the regional Sparkassen, which are the sole shareholders and guarantors. As a unit bank, with only one domestic branch in Nuremberg, it is equipped to provide the full range of domestic and international banking services.

The Bank's main activities are structured into six separate banking functions: Commercial Banking, Investment Banking, Issuing Activities, Central Banker to Bavaria and its Municipalities, Central Bank for Bavaria's Sparkassen, Building and Loan Association.

Bayerische Landesbank has also successfully expanded its own worldwide banking facilities, achieving an ever more important position in global financing for both corporate and public sector clients. The range of international services includes: International payments (SWIFT) and documentary business, trade financing, buyers' credits, foreign exchange services, Eurofinance, syndication of international loans, managing of bond issues, private placements and SD Certificates, securities trading, investment advisory services, dealing in precious metals, etc.

As one of the few banks specializing in both the credit and mortgage fields, BV is an especially versatile financing institution. Headquartered in Munich, BV has branches in the German banking capital of Frankfurt as well as in Duesseldorf, Stuttgart and Berlin. Its corporate business is conducted throughout its 408 branches which are located mainly in southern Germany. Bayerische Vereinsbank also holds interests in several well-known private banks in West Germany.

The expansion and diversification of its international business and branch network has followed the continued growth of Germany's international trading relations. The bank maintains foreign branches in Atlanta, Chicago, Cleveland, Grand Cayman, Los Angeles, New York (all operating under the name Union Bank of Bavaria), London and Tokyo. Representative offices in Athens, Caracas, Hong Kong, Johannesburg, Manama/Bahrain, Paris, Rio de Janeiro, Tehran and Milano. BV has enhanced its presence in the United States by establishing First Bavarian Capital Corporation, an investment banking affiliate in New York.

Bayerische Vereinsbank provides comprehensive banking services to individual and numerous corporate customers—amongst them several American corporations. Corporate loans are made in Deutsche marks and in principal Euro-currencies, notably U.S. dollars. International banking services include the financing of German external trade and projects in other European countries and overseas. Bayerische Vereinsbank is also engaged in extensive securities and investment banking operations. The mortgage business of the bank comprises both long-term loans to individuals and corporations and loans to or guaranteed by authorities in the Federal Republic of Germany. Both of these types of loans are financed by the bank through the issuance of bonds in the German capital market.

BAYERISCHE VEREINSBANK AKTIENGESELLSCHAFT, known in the U.S. as Union Bank of Bavaria, incorporated in Munich as a commercial bank in 1869 and merged with Bayerische Staatsbank (founded 1780), today ranks fourth among the largest private-sector banks in Germany. Together with its mortgage subsidiaries, Bayerische Vereinsbank is the largest private-sector, long-term banking group in Germany. As of June 30, 1981, the bank had a staff of 10,806 employees. Its consolidated balance sheet showed total assets of DM 93.8 billion.

BECKER OF NORTH AMERICA, INC., a member of the Becker group of companies offering products which enhance communications and safety on land and in the air, was established to sell and service Becker products throughout North America. The company's original function, when established under the name of Becker Electronics, Inc. in 1968, was to provide service for Becker auto radios, factory-installed in the leading makes of German automobiles. Becker Electronics, Inc. changed its name when its operations were expanded to include the import and distribution of Becker auto radios and Becker avionics equipment produced by Becker Autoradiowerk GmbH, Karlsbad, Germany and Becker Flugfunkwerk GmbH, Baden-Oos, Germany, respectively.

The companies are named after Max Egon Becker, who began building automobile radios in 1945 and aircraft radios approximately ten years later. Today, Becker products are found not only in automobiles and aircraft all over the world, but also in military equipment, especially that used for search and rescue operations. Becker's commitment to safety is clearly shown in its auto radio products which are designed to entertain with safety in mind.

Becker of North America, Inc. has its offices and workshops in Paramus, N.J., in close proximity to the headquarters of most European automobile importers.

brauner

91 For 50 years BRAUNER INTERNATIONAL CORPORATION has served the freight forwarding and customs brokerage needs of importers and exporters throughout the world. Founded in 1931 by Curt August Braeuner, who began his forwarding career in Hamburg, Brauner International Corporation has offices at One World Trade Center, New York as well as at J.F.K. International Airport.

Over the years, as the pace of importing and exporting has increased through the use of containerization and the increased utilization of air freight, Brauner International has kept abreast of each new development. Brauner International Corp. was the first to pioneer a through container service to Switzerland. It was first to run a regularly scheduled furniture container from Norway to the United States. The first "LASH" barge shipped door to door from Duisburg, Germany to East Chicago, Indiana was forwarded by Brauner International Corporation. Through its correspondents in Germany, Brauner International offers innovative and far-reaching forwarding services.

Through advanced office procedures

Brauner International Corporation has created systems which keep the paperwork in step with faster methods of transportation and distribution, whether it be roller bed delivered airfreight or door to door sea container distribution.

CALIFORNIA PACIFIC NATIONAL BANK, capitalized at $6 million by a broad base of both local and overseas investors, opened September 4, 1980 as the largest new national bank ever founded in the City of Los Angeles and the first new national bank in the Los Angeles financial district in more than five years.

California Pacific National Bank was established specifically to provide quality, customized services—on an individual, one-to-one basis—to foreign investors in California, U.S. business executives and high-income individuals, particularly those with active international interests, and small and medium-sized local firms with international interests.

The cornerstone of the bank's operations philosophy is private banking, the concept of tailored services to individuals and firms that require customized services including direct, everyday access to experienced professional bankers. In particular, California Pacific National Bank furnishes the kind of individual treatment needed by overseas investors in the local economy.

CHASE

Today's CHASE is a truly international financial organization operating in more than 100 countries with over 200 representative offices, subsidiaries and associates.

Chase provides multinational resources for multinational needs. The more countries become dependent upon one another economically, the more it becomes necessary to have a worldwide network such as ours, one through which capital can flow in a timely and reliable fashion.

Indeed, the rapid development of THE CHASE MANHATTAN BANK as a financial services corporation has been a direct response to the imperatives of global interdependence. And few U.S. banks are as well positioned as Chase to offer the requisite services to meet the demands of this interdependence. Through Chase's broad geographic presence, the Chase Global Industries Divisions are able to offer specialized expertise in such key industries as automotives, chemicals and mining and metals, on a global scale.

In addition, Chase provides all the classical international banking services such as foreign exchange, international money transfers, cash management and trade finance. And, through our correspondent network, consisting of more than 6,000 banks, Chase ties together the key links of world trade and global finance.

Our challenge has been to respond to meet our customer's needs as new requirements emerge. Thus, we continue to expand our functional and geographic presence.

Recognizing the increasing opportunities for East-West trade, this year Chase opened a branch in Beijing, China. Recent burgeoning opportunities in Asia and Latin America have brought about new Chase strengths to these regions as well.

Our challenge in the critical decade ahead is to continue to provide our customers with the service they expect, while at the same time, to work to improve our ability to meet the increasingly international demands of customers, wherever headquartered, of tomorrow's Chase.

CHEMICALBANK

CHEMICAL BANK, one of the world's largest full-service money center banks, serves the financial and banking needs of a broad spectrum of customers, from multinational institutions to smaller commercial businesses. Its capabilities range from traditional banking activities to customized and innovative financial services designed for the dynamic economic climate of the modern world.

Headquartered in New York, the Bank is active in every major financial center throughout the world, with a network of more than 400 domestic offices and some 50 foreign offices located in 35 countries. Through this network, its lending officers conduct business in more than 100 countries.

Founded in 1824 as a subsidiary of the New York Chemical Manufacturing Company, Chemical was the 13th bank in a then young nation. Manufacturing operations were suspended about 20 years later in favor of banking. Chemical has since grown to become one of the country's strongest and most respected financial institutions. Today, its assets total more than $40 billion and it employs more than 17,000 people worldwide. More than just a test of time, however, the Bank's longevity translates itself into the ability to analyze and serve the needs of its customers in the changing configuration of the world's economy.

The core of Chemical's business has always been wholesale banking—serving large corporate, governmental and financial institutions throughout the world. It also maintains the second largest retail or customer banking system in the New York Metropolitan area, and has Real Estate and Trust and Investment Divisions which are among the industry leaders domestically and worldwide.

CITIBANK

A subsidiary of Citicorp

CITICORP/CITIBANK: An Overview

With assets of over $100 billion and more than 1,900 domestic and overseas offices, Citicorp is one of the largest financial services institutions in the world. Its principal asset and subsidiary is Citibank, N.A., which offers banking services to individuals, private corporations, governments and financial institutions. Citibank, N.A. maintains more than 200 overseas branches and has some 325 branches in its home state of New York, and is the second-largest privately owned commercial bank in the world.

Other Citicorp subsidiaries and affiliates engage in such activities as merchant and investment banking, credit card and residential mortgage services, consumer and industrial credit, international trade finance, the development of automated office systems, and the buying and selling of money market instruments.

Together with its subsidiaries and affiliates, Citicorp has $71.8 billion in deposits and $69.9 billion in loans outstanding (as of December 31, 1980). Total staff numbers approximately 51,000, with 25,000 in domestic locations and the remainder overseas.

Citibank opened its first overseas branch in 1914 in Buenos Aires—becoming the first U.S. national bank to branch directly abroad. Over the next four years, in addition to opening more branches of its own in South American cities, the bank acquired full ownership of the International Banking Corporation, which had established its first foreign branch in London in 1902. The resulting network of 21 overseas offices in 13 countries and territories made Citibank America's leading international

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Further information in the brochure "Location Frankfurt."

Your dates to participate in 1982

- **Heimtextil** 13. – 17. 1. 1982
  International Trade Fair for Home Textiles and Household Textiles
- **IMA** 21. – 24. 1. 1982
  International Amusement and Vending Trade Fair
- **Musikmesse Frankfurt** 13. – 17. 2. 1982
  Music Fair Frankfurt
  International Trade Fair for Musical Instruments, Orchestral Electronics, Musical Accessories, Printed Music
- **Internationale Frankfurter Messe** 27. 2. – 3. 3. 1982
  Frankfurt International Fair
  International Trade Fair for Consumer Goods
- **4 x bau frankfurt** 20. – 28. 3. 1982
  Building Trade Exhibition
- **Internationale Pelzmesse Frankfurt** 17. – 21. 4. 1982
  International Fur Fair Frankfurt
- **47. interstoff** 4. – 7. 5. 1982
  International Trade Fair for Clothing Textiles
- **ACHEMA '82** 6. – 12. 6. 1982
  20th Chemical Engineering Exhibition
- **Internationale Frankfurter Messe** 28. 8. – 1. 9. 1982
  Frankfurt International Fair
  International Trade Fair for Consumer Goods
- **automechanika** 14. – 19. 9. 1982
  International Trade Fair for Equipment for Motor Car Workshops and Service Stations, Motor Car Spare Parts and Accessories
- **Frankfurter Buchmesse** 6. – 11. 10. 1982
  Frankfurt Book Fair
- **HOGA** 24. – 28. 10. 1982
  Trade Fair for the Hotel and Catering Trade
  Culinary Art, Delicatessen-Foods, Fast-Food
- **48. interstoff** 2. – 5. 11. 1982
  International Trade Fair for Clothing Textiles
- **Touristica '82** 13. – 21. 11. 1982
  with boat, trailer, camping

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bank.

After reaching a high-point in the early 1930s, the bank's international operations declined under pressure from a Depression and then a World War, after which it grew slowly until the late 1950s. At that point Citibank's senior management perceived significant new growth opportunities abroad, particularly in Europe, and instituted a program that by 1967 had expanded Citibank's overseas presence from 82 offices in 27 countries to 208 offices in 61 countries.

Throughout the late 1960s and 1970s, Citibank's foreign operations continued to grow rapidly, especially in the developing nations, and during the past few years, 70% or more of the corporation's earnings have come from abroad.

Citibank introduced new commercial services, too, such as the monthly payment loan for small businesses, first offered in 1935. And when, in the early 1960s, short-term investment began to attract funds away from the banking system, Citibank created a new money market vehicle, the negotiable certificate of deposit, which has since become one of the major means by which banks buy money to lend to business. Ten years later, in 1971, Citibank created another significant innovation, the "floating base rate," a benchmark for setting prices on certain business loans that is more flexible and sensitive to actual market conditions, and less influenced by political factors, than the so-called prime rate.

Since the mid-1970s Citibank has committed substantial resources to the expansion of staff, systems and marketing in its worldwide consumer businesses. In 1977, it unveiled its first "electronic" branch, and Citibank's network of more than 200 Citicard Banking Centers (card-activated banking terminals) in the New York metropolitan area now handles nearly 50 million deposit, withdrawal and other transactions each year.

This planned expansion of consumer activities is part of Citicorp's long-term strategy for meeting the challenges of the 1980s.

For thousands of U.S. businessmen their yearly visit to one or more of the international trade fairs staged by the KOELNMESSE—COLOGNE TRADE FAIR CORPORATION—is a must. As exhibitors or visitors they promote via Cologne their export or import not only with the EC countries but with partners from all over the world.

The Cologne program includes 25 international trade fairs and trade exhibitions which have been held regularly for several years, if not decades. They are the official events for the respective branches of German industry and are considered as the most important of their kind in Europe, sometimes in the world. Major industries represented by the different trade fairs are housewares, iron products, leisure and hobby goods (including photography, film, audiovision, sporting goods as well as bicycles, motor bicycles, gardening equipment and arts), food products, furniture, textiles and clothing.

Of the 20,000 exhibitors from nearly 90 countries participating in the Cologne fairs, 50% are from abroad. Of the total of more than 1 million visitors every third visitor is non-German. The United States is represented at the different trade fairs by some 600 exhibitors and 4,000 visitors and thus make up the largest non-European contingent. Since 1970 the number of American exhibitors has doubled, and the number of trade visitors has increased by 60%.

In contrast to the U.S., German trade fairs are in most cases the responsibility of fair corporations which organize the trade events according to a clearly established marketing concept. Most of the fairs are open to trade visitors only. The Cologne Trade Fair Corporation, founded in 1922, is an autonomous and independent business enterprise with a yearly turnover of about DM 110 million (US $60 million) which receives no subsidies of any kind. It has a permanent staff of some 350 specialists and 67 agencies in 59 countries with long established, world-wide contacts with industry, associations, authorities and news media. In the USA it is represented by the German American Chamber of Commerce, New York. The exhibition buildings consist of 14 connecting halls with a floor space of 2.3 million square feet, convention facilities for up to 5,000 delegates and up-to-date service facilities belonging to the Cologne Trade Fair Corporation. The exhibition grounds are situated in the center of the Rhineland metropolis of Cologne and directly linked to the European highway network.

BANK

COMMERZBANK

COMMERZBANK was founded in 1870 by Hamburg merchants and bankers and, through a series of acquisitions and mergers, soon became a leading force in German banking. Today it ranks third in size among German commercial banks and is engaged in all forms of commercial banking, as well as in underwriting, syndicate and investment banking. The emphasis in commercial banking is on short- and medium-term loans, with long-term lending of increasing significance in recent years. Retail banking has also experienced rapid growth over the last decade.

The Commerzbank group maintains a domestic branch network of some 880 offices located throughout West Germany and West Berlin, with a staff of well over 21,000. It comprises 20 domestic banking and financial associates, the most important of which are Berliner Commerzbank and Rheinische Hypothekenbank, a leading German mortgage bank.

Foreign activities have a significant part in the Bank's overall business, whose international departments are all located in Frankfurt. Major holdings abroad include 100% interests both in Commerzbank (South East Asia Ltd.), Singapore, and in Commerzbank International S.A., Luxembourg, a 60% stake in Europartners Bank (Nederland) N.V. in Amsterdam and Rotterdam, and a 40% interest in the New York investment bank EuroPartners Securities Corporation, as well as holdings in more than 30 other financial institutions in about 20 countries. In addition, Commerzbank operates eleven foreign branches—in Antwerp, Atlanta (agency), Barcelona, Brussels, Chicago, Hong Kong, London, Madrid, New York, Paris, and Tokyo, and 17 representative offices. In all, the Bank today offers world-wide facilities in 34 countries at 70 different locations.

From the very beginning, Commerzbank has maintained especially close relations with the Americas. In 1971, Commerzbank transformed its New York representative office, which was opened in 1967, into a branch—thus becoming the first German bank to operate a full-service branch in the U.S. In 1974, the Bank's U.S. operations were expanded with the establishment of a second branch in Chicago, and in 1979 its presence was further extended through the opening of an agency in Atlanta, Ga.

The Bank's capital and reserves as of December 31, 1980 totaled DM 2.478 billion. Its balance sheet total amounted to nearly DM 65 billion while its consolidated total assets exceeded DM $100 billion.

DG BANK

Deutsche Genossenschaftsbank

DG BANK, with headquarters in Frankfurt am Main and two units in the United States, continued to expand its international business in 1980. At year end, it accounted for 20.7 percent of the Bank's consolidated business volume (comprising total assets and contingent items) which during the year under review grew by 14.7 percent to DM 69.9 billion (the equivalent of U.S. $35.5 billion). The New York Branch again steadily increased its credit business; the Los Angeles Agency completed its first full year of business operations, further intensifying its relationships with corporate customers in particular. In addition, American corporations showed growing interest in Euro-loans made available through the Bank's Cayman Islands Branch.

Net consolidated income for the year was DM 69.4 million (previous year: DM 44.8 million) of which DM 40.2 ($13 4) million were allocated to reserves; shareholders' equity thus reached DM 1.195 billion. The Bank's dividend, which is tax free for the recipients, remained unchanged at 5 percent.

On July 1, 1981, Mr. Helmut Guthardt succeeded the retiring Chairman of the Board of Managing Directors, Dr. Felix Viehoff. Mr. Guthardt had been Vice Chairman since 1973. Karl Georg Mueller, formerly Vice Chairman of SGZ-Bank, Frankfurt am Main/Karlsruhe, was appointed Vice Chairman of DG Bank effective July 1, 1981.

In the Federal Republic of Germany, DG Bank serves as central bank and liquidity manager for a system of more than 4,200 local banks organized as cooperatives, nine regional banks, and a number of specialized financial institutions. This system, owned by more than 9.1 million shareholders, operates 19,700 offices throughout the country. At year end, 1980, its consolidated assets exceeded DM 344 billion (U.S. $175 billion).

DANIEL INTERNATIONAL

DANIEL CONSTRUCTION COMPANY, the major division of Daniel International Corporation, serves worldwide clients in engineering and construction through a strong operating base in the USA and its branch offices in the Caribbean, Europe, and the Middle East.

In addition to serving the power industry, Daniel's activities cover chemical and pharmaceutical facilities, food processing plants, a broad range of industrial installations for pulp and paper, rubber, glass, aluminum, fabrication and assembly plants ranging from electronics to automobiles. The company also is a major builder of commercial and institutional buildings, such as office towers, warehouses, etc.

Daniel normally has more than 250 projects under construction around the world. Their values range from several thousands to billions of dollars. In cooperation with the Fluor Corporation, which acquired Daniel in 1977, Daniel is further concentrating on additional international projects involving China, Japan, and African countries. To supplement engineering and construction, or construction management services, Daniel provides industrial maintenance and an extensive crafts training program.

DELTA

The Eighties hold both challenges and opportunities for the air transport industry. Cost control, productivity and operating efficiencies will take on increased importance.

While 1980 was a year of solid accomplishment for DELTA AIR LINES, such was not the case, unfortunately, for the entire industry. Even though the United States is experiencing a mild economic recession and the rate of inflation is expected to continue through 1981, Delta looks forward to the future with great anticipation. In efforts to assure the continuation of effective, high standard domestic and international services which will support the further development of German-American relationships, the company is carefully studying and implementing plans for future operations and routings. Under the U.S. deregulation act, carriers have new flexibilities regarding route and rate matters and in this free enterprise arena, the efficient will prosper.

Although Delta's current fleet of aircraft is one of the most fuel-efficient in the world today, orders have been placed for replacement aircraft which will offer significantly improved efficiencies in years to come. Wide-ride Boeing 767 aircraft (20) are scheduled to be phased into the Delta fleet starting in 1982, followed by the B-757 (60) starting in 1984. In addition, Delta has asked major airframe and engine manufacturers to produce a third generation of new, highly efficient 150-passenger aircraft for use on the world's short stage length marketplaces.

Delta's management is confident that its 36,000 employees with a long history of high productivity and a spirit of dedicated service to travelers and shippers, using the latest state-of-the-art aircraft and facilities, will continue to produce a product which will stimulate increases in traffic, both domestic and international, to the benefit of the publics they serve and to Delta alike. Delta offers daily roundtrip L-1011-500 services between Frankfurt and the U.S.A. via the Atlanta gateway.

THE FRIENDSHIP OF THOSE WE SERVE — IS THE FOUNDATION OF OUR PROGRESS

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Deutsche Bank
A century of universal banking

The DEUTSCHE BANK AG, headquartered in Frankfurt/West Germany, is the largest bank in the Federal Republic of Germany on the basis of assets, deposits, loans or capital. The Bank together with its consolidated subsidiaries is one of the leading banking enterprises with total assets as per December 31, 1980 of DM 174.6 billion, deposits of DM 118.1 billion and stockholders' equity of DM 4.87 billion.

The Bank is engaged in a full range of commercial banking activities such as providing credit of all types and maturities and accepting deposits. In addition, the Bank is, in Germany, active in underwriting, distributing and trading securities and holds equity investments in some of the leading industrial corporations in Germany. The Bank's consolidated subsidiaries are engaged in mortgage lending, investment management, property management, leasing and construction financing. Through Deutsche Bank Compagnie Financiere Luxembourg, the Bank is one of the leading institutions involved in Euro-market lending and loan syndication.

Due to the Bank's size, the broad range of its activities and its close ties with some of Germany's leading corporations, it is an integral part of the German banking system.

The New York branch of Deutsche Bank was established in 1978. The branch is involved in commercial wholesale banking with an emphasis on short and medium-term lending; trade finance; documentary international business; foreign exchange and money market dealings. Internationally, the branch is concentrating on Latin American business. For international financing purposes, the branch conducts the business of a Cayman Island branch as a Euro-market activity of the bank.

By late 1980, Deutsche Bank had 12 branches and 6 wholly-owned affiliates abroad. There are presently 88 branches, affiliates, and representative offices in 53 countries.

At year-end 1980, the bank employed 39,242, and the Group a staff of 44,128 at 1,151 branches and 1,361 branches, respectively.

DIDIER

DIDIER is one of the oldest German industrial companies. It was founded back in 1834. Its French name is from the founder of the company, Ferdinand Didier, a descendant of Huguenots who came to Germany in search of religious freedom.

Didier is one of the largest manufacturers of refractories in the world. Its high-quality products are subjected to temperatures to 2000° C (3632° F) and above in industrial melting and firing processes. Other application fields are heat storage and high temperature insulation. Didier makes a significant contribution to overcome the main problem of today—energy shortage.

Didier also designs and constructs hot-blast stoves, plants for the upgrading of coal, fittings resisting high temperatures, industrial melting furnaces, acid-resistant systems, industrial and communal filtering plants, protective paints for houses and buildings.

In 1980, the Didier Group had worldwide sales of US $ 516 million and a total of 6,682 employees. The company has manufacturing facilities in Germany, France, Spain, Canada, and the United States. Its sales organizations and construction companies are spread all over the world. The raw materials are purchased in many countries and two-thirds of the world production is sold outside Germany.

In the United States, Didier is represented by Didier Taylor Refractories Corporation (DTRC) in Cincinnati, Ohio (with plants in Cincinnati and South Shore, Ky.). DTRC operates closely together with Didier Corporation de Produits Refractaires (DCPR) in St.-Laurent/Québec and its plant in Bécancour/Québec. Both of these companies are involved in the manufacture of very high-quality refractories and offer the entire Didier service. Their sales of US $ 61 million (1980) are a significant contribution to the worldwide Didier Group.

DRESDNER BANK was established in Dresden on November 12, 1872. In 1873, when the Bank completed its first full year of business, its total assets amounted to just over five million Thalers. More than one hundred years later, Dresdner Bank AG, now with headquarters in Frankfurt/Main, has consolidated total assets of more than DM 123 billion (as of Dec. 31, 1980), making it the second largest commercial bank in the Federal Republic of Germany and one of the largest banks worldwide.

As a "universal bank," the Dresdner Bank is active in commercial as well as investment banking in Germany and abroad, and offers a full range of corporate and retail banking services. It holds a leading position in placing bond issues floated by domestic and foreign issuers, in managing capital increases of German corporations and in introducing foreign shares to German stock exchanges. The bank plays a prominent part in the domestic and international money and foreign exchange markets as well as in bullion trading.

International banking has always played a prominent role among Dresdner Bank's banking services. In recent years, the Bank has strongly intensified its involvement in the United States and maintains full operating branches in New York, Chicago and Los Angeles and a Representative Office in Houston, Texas. An additional office will soon be opened in Miami, Florida. With its 75 percent participation in ABD Securities Corp., Dresdner Bank has also gained a solid position in the U.S. brokerage and investment banking business.

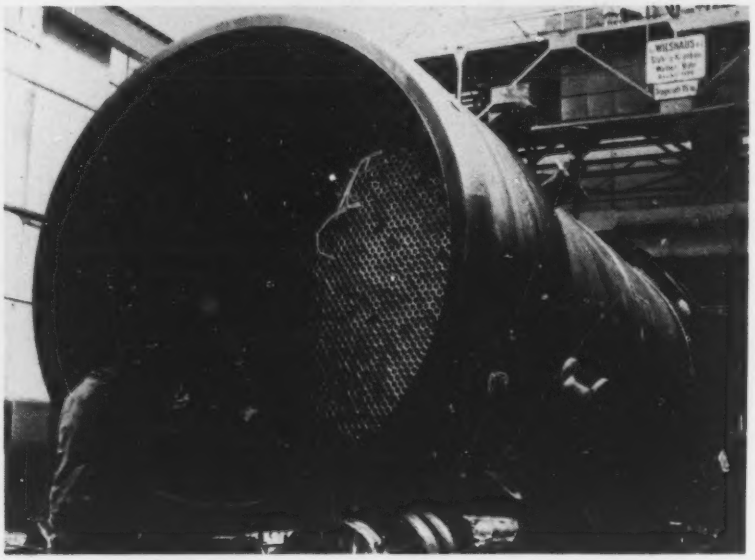
Through the Deutsch-Suedamerikanische Bank AG, Hamburg, a member of the Dresdner Bank Group, and through various other participations, the Bank has traditonally maintained close ties with markets in Central and South America. Dresdner Bank also operates branches in London, Madrid, Milan, Tokyo, Singapore and Hong Kong. It has subsidiaries in Luxembourg, the Compagnie Luxembourgeoise de la Dresdner Bank AG—Dresdner Bank International (CLB) and in Singapore, Dresdner (South East Asia) Ltd. (DRE-SEA) and has at present 28 Representative Offices in major financial and trade centers in the world. Last but not least, it is a member of the ABECOR Group (Associated Banks of Europe). All of these demonstrate the local presence that Dresdner Bank prefers for its international activities.

We are happy to serve our customers at home and abroad.

Dynamit Nobel

DYNAMIT NOBEL OF AMERICA INC. (DNA) is a wholly owned subsidiary of Dynamit Nobel AG of Troisdorf, West Germany, a diversified chemicals, plastics, ammunition and silicon products concern with world wide sales of DM 2.8 billion in 1980. DNA conducts an importing and

Vital Dimensions in Metals



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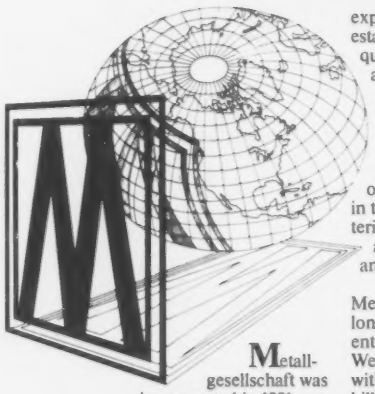

Metallgesellschaft was incorporated in 1881 as a joint-stock company to carry on a long-standing Frankfurt metal trading business. In the course of its history Metallgesellschaft continuously expanded its activities by establishing new or acquiring existing plants and by merger with or participation in other companies. Today, the group companies thus formed encompass a widespread organization operating in the fields of basic materials and capital goods as well as engineering and contracting.

Metallgesellschaft belongs to the important enterprises of the West German industry: with a turnover of DM 10 billion it occupies roughly 20th place. The MG-Group with almost 30,000 employees engages in the exploitation and beneficiation of ores and industrial minerals for supply to its own smelters or chemical plants. Part of the metals produced as well as metals from other sources are processed into semifinished and finished products in works of the Group. Together with the metal processing goes the manufacture of plastic goods by similar technologies. Metallic components of ores and their sulphur content form a basis for the production of chemicals, especially sulphuric acid, sulphur dioxide, white pigments, fillers, barium, caesium, lithium, and sodium compounds. The trade in raw materials, which was originally restricted to non-ferrous-metals and ores, now also extends to other commodities: sulphur, phosphates, fluorspar, alumina, rubber, and coal. The tasks connected with production, distribution, and trading made it advisable to provide integrated transport and insurance services. The financial transactions of MG performed on an international scale are entrusted to its own bank. Technological know-how, especially in the fields of ore preparation and smelting, chemical production, petroleum processing, upgrading of solid fuel, and environmental control, is offered on a world-wide basis by the Group's engineering companies.

Metallgesellschaft AG · Postfach 3724 · Reuterweg 14 · D-6000 Frankfurt 1
Metallgesellschaft Ltd. · 19-21 Great Tower Street · London EC3R 5AQ
The Ore & Chemical Corporation · 605 Third Avenue · New York, NY 10158

manufacturing business in the U.S. with plants in five states, and is expected to reach sales of close to $200 million in 1981. Its activities are subdivided into four major sectors: Plastics, Chemicals, Sporting Arms/Ammunition and Silicon Products.

In the field of plastics, most of DNA's products are based on the processing of PVC (polyvinyl chloride). The best known product is TROCAL Roofing, a vinyl membrane used in flat roofing of mostly commercial buildings. Another product group, TROCAL rigid PVC windows, offers excellent insulation properties for this energy-conscious age. Other products include TROVIDUR rigid PVC and polypropylene sheets for industrial uses and TROCELLEN cross-linked polyethylene foam for a wide variety of applications from leisure time articles to automotive uses.

DNA's subsidiary, Harte & Co., is one of the leading manufacturers of flexible vinyl sheeting for numerous decorative uses such as juvenile furniture, shower curtains and wall coverings, as well as for industrial and building applications such as pool and pond liners, electrical and medical bags.

In the field of chemicals, DNA's activities are conducted through its subsidiary Kay-Fries, Inc., with plants in Stony Point, New York, and Mobile, Alabama. Kay-Fries, Inc. manufactures and imports a great variety of chemical intermediates used primarily in the production of pharmaceuticals, dyestuffs, agricultural chemicals and fragrances. Principal products are ortho-esters, cyanoacetates, phenyl glycine, which is used in the production of synthetic antibiotics, and silanes/silicates which are supplied to the paint, foundry and fiber industries and also find applications as waterproofing agents.

In the Sporting Goods/Ammunition sector, DNA is known for its imported lines of Trap and Skeet Guns, Air Rifles, and Rottweil, Geco and RWS sports ammunition including the unique Brenneke shotgun shells.

In the field of silicon products, DNA imports materials for the semi-conductor industry manufactured by DNAG's subsidiary SMIEL in Italy.

EM INDUSTRIES, INC.

EM INDUSTRIES, INCORPORATED, a subsidiary of Merck AG of Zug, Switzerland, and the U.S. associate of E. Merck, Darmstadt, Germany, is a diversified manufacturer of specialty chemicals for many different applications. The Merck group resumed its activities in the U.S. in 1971 with the creation of EM Laboratories, Inc., which was recently renamed EM Industries, Incorporated. EM Industries' business will reach a volume of $80 million in 1981 and is channeled through four operating divisions.

The EM Chemicals Division supplies a wide range of high quality specialty products to the pharmaceutical, food, electronics, optics and plastics and coating industries. During 1978 and 1979, the first phase of a new chemical complex was constructed in Savannah, Georgia, where pearlescent pigments for cosmetic and industrial applications are manufactured. In a recent addition vacuum deposition materials for the optical and electronic industries are produced.

The Rona Pearl Division, which was acquired in 1975, is a major supplier of specialty chemicals to the cosmetics industries. Rona Pearl has pioneered in the development of the first synthetic nacreous pigments approved for cosmetic use. These pearlescent pigments add an iridescent glow to powders, eye shadows, blushers, lipsticks, liquid makeups, nail enamels, creams, shampoos and soaps.

The EM Science Division was formed in 1980 by merging the recently acquired Harleco group with MCB Manufacturing Chemists, which was acquired in 1977. MCB is one of the oldest, most respected names in the field of laboratory chemicals. MCB had been able to extend its product offerings with the addition of fine laboratory products for E. Merck, Darmstadt, the largest worldwide supplier of high purity chemicals. MCB manufactures and sells close to 4,000 products used for analytical and research purposes in industrial, educational and governmental laboratories. Harleco has been for years a well established company in the clinical chemistry market. As E. Merck, Darmstadt, concentrates part of its very active research towards this particular field, it is expected that Harleco will be able to expand its offerings and broaden its product line especially in clinical chemistry. Harleco at present manufactures and sells over 800 products used in applications. Major users are hospitals and private clinical laboratories, as well as government health services.

Center Laboratories, which joined the EM group early in 1979, offers a line of quality controlled, highly effective extracts to the allergist. These biological products include extracts of pollens, molds, dusts, inhalants, epidermals, insects and food which are used to bring relief to allergy sensitive patients.

In addition to these commercial activities, EM Industries conducts clinical research for the Pharmaceutical Department of E. Merck, Darmstadt, and is testing new plant protection products developed by Celamerck of Ingelheim, Germany.

EUROPARTNERS SECURITIES CORPORATION

EUROPARTNERS SECURITIES CORPORATION is the United States' full service investment banking and securities affiliate of Commerzbank (Germany), Credit Lyonnais (France), Nordic Bank Limited (England), Bank Leu (Switzerland) and Banco di Roma (Italy).

The firm was incorporated in New York in 1968 by Credit Lyonnais, under the name of Credit Lyonnais Corporation. The name EuroPartners Securities Corporation was adopted in 1970 when Banco di Roma and Commerzbank became shareholders. In September, 1974, Nordic Bank Limited, a joint affiliate of Svenska Handelsbanken (Sweden), Den Norske Creditbank (Norway), Kansallis-Osake-Pankki (Finland), and Copenhagen Handelsbanken (Denmark), became a shareholder. Bank Leu became a shareholder in 1975.

With emphasis on serving clients in the United States' financial markets, EuroPartners Securities Corporation performs a full range of international investment banking and securities brokerage functions, which represent a portion of the total banking business conducted by its parent banks as "universal" European banking institutions.

In 1968 EuroPartners Securities Corporation was one of the first investment banking and securities affiliates established in the U.S. by major foreign banks. In February 1979 EuroPartners became the first European-owned U.S. securities firm to become a member firm of the New York Stock Exchange. Today, EuroPartners Securities Corporation is one of the leading foreign-owned securities firms in the U.S. with capital in excess of $8 million, offering a full range of corporate finance, investment management, research and securities brokerage services to an ever broadening group of corporate, institutional and individual clients in the U.S. and abroad.

Investment banking and corporate financial services provided by EuroPartners to European and American client companies include: underwritten public offerings of securities, private placement financing, tax-exempt industrial revenue and pollution control bond financing,

mortgage financing for corporate real estate, leverage lease financing, tender offers, merger and acquisition expertise, venture capital financing, financial evaluations, and assistance with debt ratings and U.S. and foreign stock exchange listings.

A fundamental premise underlying the development of EuroPartners' corporate finance services has been an uncompromising commitment to giving client companies the best possible advice and counsel concerning financing or investment banking matters in the domestic U.S. market and international capital markets and to executing financing or other assignments effectively and professionally. U.S. companies look to EuroPartners for responsive and professional corporate finance services. European companies operating in or entering the U.S. market benefit from EuroPartners' extensive experience with the financial, accounting, legal and business problems that its overseas client companies encounter repeatedly in acquiring, developing and financing U.S. operations.

EAB
European American Bank

EUROPEAN AMERICAN BANCORP, headquartered in New York City, is the holding company for European American Bank & Trust Company, European American Banking Corporations, Dorman & Wilson Inc., EAB Venture Corp., and Euramlease, Inc. Our resources exceed $8 billion.

European American Bank, an American bank chartered in New York State, is among the top 30 of the 15,000 commercial banks in the United States. We serve a worldwide market and offer a highly diversified range of products and services to consumers, small business, middle market companies (firms with annual sales of between $3 million and $250 million), U.S. multinational and European corporations, banks and governments.

European American Banking Corporation is an investment company with commercial banking powers, specializing in international finance and foreign exchange. The Banking Corporation has locations in Los Angeles, San Francisco, Nassau (Bahamas), Bermuda and Luxembourg.

European American Bank & Trust Company is a full-service commercial bank with over 90 branches in the New York/Long Island area and additional branches or subsidiaries in the Cayman Islands, the Bahamas, Chicago, Los Angeles and Miami. It is a member of the Federal Reserve System, the Federal Deposit Insurance Corporation and the New York Clearing House Association.

Dorman & Wilson is a major real estate financing company.

EAB Venture Corp. provides growth capital to qualified companies.

Euramlease, Inc., provides leasing arrangements to companies in the U.S. and abroad.

European American Bancorp is owned by six of Europe's largest banks, with combined resources of over $360 billion. The unique association provides access to a network of over 10,000 banks around the world. Our shareholder banks are: Amsterdam-Rotterdam Bank N.V., Netherlands; Creditanstalt-Bankverein, Austria; Deutsche Bank AG, Germany; Midland Bank Limited, United Kingdom; Societe Generale de Banque, Belgium; and Societe Generale, France.

FAG

FAG BEARINGS CORPORATION is an international organization whose trademark is a worldwide symbol of quality and dependability in the design and manufacture of bearings in all sizes and configurations. FAG is recognized as the signature of one of the world's oldest and largest manufacturers of precision ball and roller bearings. Since 1883 FAG has led the way in the development and refinement of bearing design and technology. Today, FAG employs over 31,000 people in branches and affiliate plants in the U.S.A., Canada, Brazil, Germany, Austria, Switzerland and Portugal. There are, in addition, FAG sales and service offices and distributors in more than 100 countries.

FAG headquarters in the U.S.A. are located in Stamford, Connecticut, where a full complement of administrative, marketing, engineering and distribution personnel service the American market. The chief U.S. production facility is in Joplin, Missouri. Now undergoing extensive expansion, the Joplin plant will be producing by 1982 an extended range of bearing types in sizes hitherto never produced in the U.S. FAG's capabilities in bearing design and manufacturing are second to none. From automobiles to steel furnaces, farm machinery to spacecraft, FAG is ready to provide bearings, housings, accessories and components, whatever and wherever the need.

FLORIDA

Die kaufkraeftigen Maerkte Westeuropas, Kanadas, Asiens und Lateinamerikas entdecken in zunehmendem Masse die Vorteile des Staates Florida fuer Handel und Industrie, was dazu fuehrt, dass der internationale Handel und Investionen bestens gedeihen.

Foridas strategisch guenstige Lage auf halbem Wege zwischen den Staaten des amerikanischen Kontinents, die natuerlich vorhandenen und noch zusaetzlich geschaffenen Vorteile des Staates fuer den Handel und die Tatsache, dass Florida als suedlichster Bundesstaat als Standort fuer auslaendische Investitionen ganz einfach attraktiv ist—alle diese Kriterien geben Florida einen der ersten Plaetze am internationalen Markt.

Natuerlich werden die Geschaeftsinteressen auch durch das gut ausgebaute Netz an Seehaefen, durch die direkten Luft- und Transporteinrichtungen, die internationalen Banken und die Aussenhandelszonen angelockt, sowie auch durch die multi-nationalen Bueros, Dienstleistungen, eine guenstige Steuerstruktur und eine Vielzahl von Arbeitskraeften mit guten Sprachkenntnissen.

Der Staat heisst Handel und Industrie aufs Herzlichste willkommen und hat sich stets bemueht, jedes Land wissen zu lassen, dass Florida am Geschaeft interessiert ist. Floridas Handelsministerium unterhaelt nun Bueros fuer Wirtschaftsentwicklung in Stuttgart und Toronto sowie ein Buero fuer Lateinamerika in Sued-Florida, um den Kontakt mit moeglichen Handelspartnern und Investoren zu erleichtern. Das Buero fuer Lateinamerika befindet sich deshalb in Florida, weil der Staat die Erfahrung gemacht hat-wie ueber 100 multinationale Unternehmen auch—dass diese Marekte von dort aus besser angegangen werden koennen.

Von Zeit zu Zeit veranstaltet Florida auch Besprechungen zwischen Vertretern des Staates und des Handelsministeriums einerseits und auslaendischen Firmen andererseits, um deren spezifische Beduerfnisse zu eroertern.

Den auslaendischen und amerikanischen Unternehmen stehen eine Reihe von Deinstleistungen zur Verfuegung, wie z.B. Studien ueber Marktbedingungen, Computer—und technische Hilfeleistung, kostenlose Plazierung von "Match up" Annoncen in einer internationalen Publikation, Forschungsarbeit fuer interessierte Firmen, Veranstaltung von Handelsmessen und Hilfe bei der Auffindung des richtigen Standorts.

Florida verfuegt ueber ausgezeichnete Luft—und Wassertransporteinrichtungen, darunter 14 Seehaefen und 13 Flachwasserhaefen. Unter den Vorteilen, die die sechs internationalen Flughaefen des Staates bieten, sind Non-stop-Fluege nach Europa, Suedamerika und den wichtigsten U.S.-Staedten. Gut ausgebaute Strassen runden das Transportnetz ab.

1980 verzeichnete Florida 17 Milliarden Dollar im internationalen Handel—3.3 Milliarden Dollar mehr als im vorigen Jahr. Der Staat besitzt fuenf Aussenhandelszonen, weitere sind im Bau. 26 Banken bieten internationalen Service. Eine Stadt ist Heimat fuer 23 "Edge Act" Bankgesellschaften und wird nun zum Zentrum fuer "Master Edge Act" Bankgesellschaften. Diese Banken taetigen auch internationale Geschaefte. Uber 100 multinationale Firmen haben ihre amerikanischen Bueros in Florida. Weiterhin finden sich auch 21 Zweigstellen auslaendischer Banken.

Eine angemessene und gerechte Steuerstruktur macht den Aufbau von Unternehmen sehr attraktiv. Bei jaehrlich 36 Millionen Besuchern, die 1980 mehr als 17 Milliarden Dollar ausgaben, kann Florida es sich leisten, die Unternehmenssteuern niedrig zu halten. Florida ist einer der sechs Bundesstaaten in den USA, in denen es keine staatliche Einkommenssteuer gibt--in dieser Beziehung der einzige Staat im Suedosten der USA. Auf Lebensmittel, Arznei oder Haushaltsgueter wird keine Umsatzsteuer erhoben. Ebensowenig wie auf Maschinen oder Ausruestungen fuer neue Produktionszentren. Bei Benzin, Oel, Holz oder Kohle, das fuer Industrieproduktion benoetigt wird, besteht ebenfalls keine Umsatzsteuer.

Floridas vielfaeltige Vorteile, einschliesslich des echten Interesses des Staates an der wirschaftlichen Entwicklung, bieten dem internationalen Handel und Investitionen ganz erheblich Moeglichkeiten.

FRANKFURT FAIRS AND EXHIBITIONS, with a worldwide impact on commerce and trade, evolved from an 800-year tradition of international trade markets. By following or even anticipating the latest trends of their times, they constantly remained modern in the best sense of the word. The present evidence is a DM 400 million construction program. On the 50.5 acres of fair grounds, this provides facilities designed for the trade show expectations of the 1990's. The best conditions will be available for trade events of all kinds and sizes, for flexible adjustments to the requirements of all industries. Most of all, the dominating criterium of today's schedule of events will be emphasized: internationality.

Besides the Frankfurt International Fair, world-renowned "opinion leader" for high quality consumer goods, Frankfurt hosts another biannual event, the *Interstoff*. In May and November fashion designers and manufacturers acquaint themselves with the latest trends in clothing textiles. The annual *Heimtextil* fair draws more than 55,000 visitors, and features carpeting, curtains and other types of household textiles. The annual *International Fur Fair*, one of the leading trade events in the field, offers products from the fur finishing and processing industry as well as the season's latest designs.

The *Frankfurt Book Fair*, with more than 5000 participating publishing houses from over 90 countries, is the largest market for books, copyrights and translation rights.

In alternate two-year intervals, two exhibitions for the automotive trade are staged in Frankfurt: the IAA *International Automobile Exhibition*, which attracts more than one million visitors; and the *automechanica*, which features equipment for automotive workshops and service

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stations as well as spare parts and accessories.

Other important fairs include: the ISH International Fair for household sanitary, heating and air conditioning technology; ACHEMA—chemical equipment and apparatus; IFFA, an international fair for meat processing equipment.

Whatever the direction of the economic graph, the Frankfurt Fairs continue to distinguish themselves for the results they achieve for buyer and seller alike. The ever growing participation from all parts of the globe is the best proof of this claim to quality and performance.

GARRETT

THE GARRETT CORPORATION produces high-technology flight systems and components and provides numerous aviation services.

Its various disciplines extend across the spectrum of commercial, military and general aviation. Garrett has also increasingly diversified into the rapid transit and industrial fields, applying its aerospace expertise and technology to these endeavors.

Garrett has 18 major divisions and subsidiaries and associated components in the United States, Canada and overseas. It features 24 distinct product lines, manufacturing more than 5,000 different items for civilian and military, air, ground and marine applications.

Garrett became one of The Signal Companies in 1964, and today has some 22,000 employees—about one-fourth of whom are scientists or engineers.

Major Garrett products include turboprop and turbofan aircraft engines, environmental control systems, and heat transfer, cryogenic and mechanical systems. The company produces a wide range of electronics equipment, pneumatic control, actuation and turbine systems, auxiliary power units, emergency locator transmitters and personnel locater beacons, along with inflatable rafts, slides, slide/rafts and life preservers.

Aviation services include design and installation of custom interiors and complete avionics systems, as well as engine and airframe retrofit. Fixed base services are also offered.

In the rapid transit field, Garrett has become a leader in the development and production of electric propulsion systems. It produces gas turbine engines for industrial and marine use, and is making regenerators for gas turbine electric generating plants in the 60,000 pound class. It is also developing a 500-horsepower gas turbine engine for trucks and buses.

Garrett fuel saving turbochargers are in wide use on trucks, buses, tractors, cars and aircraft. The company also makes iron, steel and aluminum castings for both aviation and industrial use, with much of the output going into Garrett turbochargers, gas turbine engines and aircraft systems.

GENERAL ELECTRIC
U.S.A.

GENERAL ELECTRIC COMPANY, U.S.A., with annual sales of $25 billion, provides nearly one percent of the total of all goods and services produced in the United States.

It has some 400,000 employees worldwide, manufacturing 250,000 different products at 350 manufacturing plants in 35 states in the U.S.A. and in 24 countries outside the U.S.A.

General Electric's technological leadership is derived from its historic role as the world's largest supplier of systems and products for the production, delivery, and use of electricity. From this core of interrelated electrical technologies, GE has

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produced discoveries leading to major participation in such areas as chemicals, plastics, medical systems, aircraft engines and ship propulsion systems.

The company offers more products in more parts of the world than any other company. In all, General Electric products are sold in 135 countries. General Electric's international activities accounted for approximately 40 percent of the company's earnings of $1,514 billion in 1980.

Because General Electric products and systems are so widely used throughout the world, it has gained application experience in a broad range of operating environments. The advanced technological expertise the company incorporates in systems, products and services is the result of a 100-year commitment to research and development. In 1980, GE's investment in both company-funded and contract research and development work amounted to about $1.6 billion. Much of this work is performed by GE's 30,000 engineers and scientists as well as 1,300 Ph.D.s, the majority of whom are in research. GE's total of 16,500 active patents is the largest in private industry.

A world-wide network of sales and service experts is available for initial feasibility studies, including the maintenance and repair needed during the operating life of the equipment.

Greater Cincinnati

Comprised of seven counties within Ohio, Kentucky and Indiana, the GREATER CINCINNATI area ranks as the 15th largest industrial metropolitan market in the United States. The area also ranks 17th in the United States in worker productivity and 16th in total values of export shipments. Hamilton County, in which the City of Cincinnati resides, shipped out $9.515 billion in manufactured goods in 1976, ranking sixth in the nation.

Twenty-four foreign firms have located facilities within Cincinnati, including nine German-based companies. More than 300 national and international firms have also selected Cincinnati as their home base including industrial, retailing and financial institutions. Two foreign-trade zones and two subzones have been established in the Greater Cincinnati area to encourage more importing/exporting activities.

Cincinnati's diverse industrial base has stabilized the economy and protected the community against severe national business trends. Among its more prominent manufacturing groups are transportation equipment, food and kindred products, chemicals, toiletries and detergents, and fabricated metal products.

There are other reasons why the *New York Times* has called Cincinnati America's "best kept secret." Cincinnati is linked to the nation and the world by seven major airlines, seven railroad systems, four interstate highways and 30 barge lines serving the Ohio River. The area's cost of living has consistently remained below the national average. Growth in employment has always equalled or exceeded the national average, while unemployment has historically been below the national average. Cooperation between business and government leaders has enabled the community to develop a prosperous business climate while at the same time enhancing the quality of life for workers and their families.

Greater Cincinnati is a dynamic, growing community suited for your business developments. Contact us, the Greater Cincinnati Chamber of Commerce, to learn more about our area, and perhaps your company's future.

FAIRS AND CONGRESS CITY HAMBURG: As a cultural, communications and economic metropolis, Hamburg has grown into a recognized center for international congresses and fairs. As such, the city is ideally equipped. Situated at the crossroads of multi-national markets, West Germany's biggest port and industrial city can offer hotel accommodation of 17,000 beds, first-class connections to other cities and countries and a colorful choice of attractive leisure values.

Hamburg's modern exhibition grounds with their 13 halls, covering an exhibition area of 52,500 sq.meters, and the neighboring Hamburg Congress Center, which affords accommodation for 7,500 persons in 16 rooms, present a unique opportunity for combining exhibitions with congresses. About one dozen international specialized exhibitions annually attract more than 1,800,000 visitors, and over 5,000 exhibitors from all parts of the world choose Hamburg as a venue for showing their products and services.

The German International Boat Show (staged each year in October), the specialized exhibition and congress "Ship, Machinery, Marine Technology International" (held every other year in September) and the "InternorGa", International Trade Exhibition for the Hotel, Catering and Bakery Trades, belong to the leading exhibitions of their kind in Europe. This is proved by the fact that all three exhibitions are members of the "elite club" for international trade fairs and exhibitions, the Union des Foires Internationales (UFI). The growing need today for venues where fairs can be combined with congresses is fully catered to in Hamburg by the architecturally and technically superb Congress Center Hamburg, one of the most modern buildings of its kind in Europe.

Finally, the halls are so arranged that catering facilities can be provided anywhere in the building.

Hamburg

In the Federal Republic of Germany—West Berlin not included—HAMBURG is the largest city, with a population of nearly 1.7 million. It is, at the same time, one of the 10 states of the federation.

By volume, the city's port is the largest in Germany and during recent years, Hamburg has also evolved as a leading exhibition and convention site.

As a federal state and as a city, Hamburg covers an area of 288 square miles, ranging from densely populated industrial and residential districts to farmland with orchards, fields, pastures and forests.

Tourist Attraction

Hamburg is an elegant city of astounding physical beauty. Two major lakes in the heart of downtown Hamburg are dotted with pleasure and sightseeing boats which also cruise along an extensive network of canals and waterways; and seeing Hamburg by boat is a special treat as it affords a pleasureable way of taking in the beauties of the lakeshore lined with promenades, hotels, impressive office buildings and elegant residences, or the quaint old merchants' buildings of yesteryear along the "Fleets" or canals.

Hamburg is a harmonious blend of carefully preserved and restored historic buildings and the uncluttered lines of modern high-rise architecture. The spires of Hamburg's five major churches still dominate the spectacular skyline.

Hamburg's excellent museums, its state opera and internationally renowned opera, ballet, three symphony orchestras, superior international restaurants to suit any purse, and some of Europe's finest hotels have made the city a traditional mecca for

tourists from all over the world (1980: 1.62 million). Over 43,000 North Americans visited Hamburg in 1980.

Exhibition and Convention Site

Some of the visitor boom can be attributed to the Hamburg Congress Center (CCH), the ultra-modern convention and exhibition facility. The total number of visitors rose in 1980 to 1.8 million at 371 conventions and meetings and 36 international trade fairs and exhibitions. Several of these were international conferences only being held every fourth or fifth year on a different continent attracting more than 3000 participants and lasting longer than a week. In addition, 1980 saw a total of 439, 437 visitors to 312 cultural and social events like concerts, shows, banquets and balls, as the CCH serves successfully as a multipurpose building.

Trading Center

Hamburg's prominent role as a hub of industry and commerce came fairly early in its 1,170-year history and received a great impetus during the 13th century, when an alliance with Luebeck provided the cornerstone for what was to become the mighty Hanseatic League. Germany's first stock exchange opened here in 1558. With the immigration of Dutch Protestants, Portuguese Jews and English cloth merchants (expelled from Antwerp), and with the expansion of commercial ties with the United States after 1783, Hamburg continued to prosper.

Hamburg today is an important banking center, as 145 domestic and foreign banks operate in this city. As a consular city, Hamburg ranks second only to New York, with 75 nations represented here by consulates general or consulates. The principal industries in Hamburg are electronics, chemicals and petro-chemicals, machinery and, of course, the large shipyards—to mention just a few.

Port of Hamburg

A prominent factor in the economic life of the city is the Port of Hamburg, a universal harbor, serviced by some 300 scheduled ocean lines. Total cargo volume handled in 1980 reached a record 63 million tons. A number of major projects under construction or on the drawing board are expected to expand and further improve the port facilities. Container traffic is expected to produce an increased share of the business during the next few years from the present 38% to as much as 60% of all general and bagged cargo handled.

Hamburg as Business Site

Hamburg's combined domestic product of industries and services in 1979 amounted to $32 billion, twice the per capita average of the Federal Republic.

All these factors combined, plus an international airport, superb overland and waterway routes to all parts of the continent, an excellent public transit system and a selection of choice business and industrial sites make Hamburg an attractive place for foreign investment. Hamburg extends a helping hand to all companies who are interested in locating branches or complete facilities here, especially through the services of the business and industrial consulting office of the city's Department of Economics.

Hanover

Every April at HANOVER, West Germany, the industrial world is provided with a business arena where international trade agreements totaling millions of dollars are negotiated and finalized. Over 600,000 visitors attend the annual Hanover Fair from 118 countries. They come to Hanover to evaluate the latest industrial equipment, to find solutions to improve efficiency, to discover new technology and to conclude purchase agreements.

Hanover has become known as the international business marketplace, where companies gain worldwide exposure for their products and services in just eight days. Industrial professionals meet on a one-to-one basis with representatives from around the world who have a direct interest and need for their equipment, products and services. At Hanover Fair '82, April 21-28, 1982, visitors will examine the latest technology from nine exhibit categories, including: office and data technology; electrial engineering and electronics; energy supply, generation, conversion, distribution and uses; plant engineering design and construction; factory equipment, materials and supplies; materials handling and transport; construction and tunneling technology; subtcontracting and custom manufacturing and research and technology.

But the annual Hanover Fair, the largest industrial trade show in the world, is not the only exhibition the fairgrounds has to offer. Some of the other Hanover Fairs include: EMO, the International Machine Tool Fair; Constructa, the Building Materials Fair; Didacta, the International Trade Fair for Schools, Educational and Training Institutes and ILA, the International Aerospace Exhibition.

In an effort to inform small, medium and large firms in the U.S. and Canada of the remarkable export opportunities available at the Hanover Fairs, the Hanover Fairs Information Center has been established in the U.S. The address is: Hanover Fairs Information Center, P.O. Box 338, Whitehouse, NJ 08888, toll-free telephone (800) 526-5978, in New Jersey (201) 534-9044. All necessary information concerning exhibiting at or visiting the fairs is available upon request. The Hanover Fairs Information Center works closely with the U.S. Department of Commerce, the Government of Canada and almost all of the U.S. and Canadian trade associations to encourage exports through participation at the Hanover Fairs.

"There are numerous firms in the U.S. and Canada unaware that their products, machinery or services are highly marketable abroad," explains M.A. Delia of the Hanover Fairs Information Center. "Many of these products find ready accptance at international trade fairs, like Hanover."

Hapag-Lloyd

In 1980, HAPAG-LLOYD AG, one of the world's largest shipping companies, celebrated its 10th Anniversary. The Hamburg- and Bremen-based company is represented in the United States by its North American subsidiary, Hapag-Lloyd (America) Inc., New York City.

Though they are indeed proud to have reached their first corporate decade, the heritage of Hapag-Lloyd goes back to the days of sailing ships. And as for celebrations, both the Hamburg-American Line (HAPAG), founded in 1847, and North German Lloyd, founded in 1857, have each separately toasted milestone 50- and 100-year anniversaries.

But the sum of these first ten years of the joint Hapag-Lloyd entity adds up to much more than a decade of success. The strategic consolidation and streamlining at the beginning of the 1970's gave way later in the decade to an equally well-planned expansion program based on market diversification. The events and achievements of each of the last ten years have brought Hapag-Lloyd closer to its goal: to provide the most advanced network of transport services on the sea, in the air, and on land.

With its heritage in the sea, the birth of the new company came at a time when containerization was also in its infancy. Indeed, the merger of HAPAG and North German Lloyd was brought about as a

result of the high capital investment needed to convert to containerization. Both Hapag-Lloyd and containerization grew together to be strong and healthy in the 1970's.

Before the decade even began, HAPAG and North German Lloyd had engaged in the first fully containerized service on trans-Atlantic routes under the trade name Hapag-Lloyd Container Line. By 1978, the first generation containerships of the late 1960's yielded to newer, more modern 1758 teu vessels to meet the demand for additional cargo space. Hapag-Lloyd's containership fleet, which began as four in 1968, grew to 18 by 1978, and today stands at 29.

Hapag Lloyd's container fleet grew in a very impressive way in mid-1981 with the introduction of its 3045 teu Frankfurt Express. This vessel, slated for the TRIO Service, is the largest containership in the world.

The Hapag-Lloyd travel organization, called Hapag-Lloyd Reisebuero, today operates with 70 offices throughout the Federal Republic of Germany, West Berlin and the United Kingdom. All aspects of corporate and private travel services are offered. Recent growth of this sector in North America is reflected in the 1980 establishment of Hapag-Lloyd Travel, with offices in New York, Chicago and Atlanta, with plans to open additional offices in major cities.

To meet the demand for longer cruises and more exotic destinations Hapag-Lloyd will be introducing a new "Europa" at the end of 1981. The old Europa which has served more than 170,000 passengers for over a decade, will be phased out of operation.

On the land Hapag-Lloyd has made great inroads since 1970. Where overland container movement was in its early stages at the beginning of the decade, Hapag-Lloyd has made true door-to-door service a reality. Through the effective use of container pools, shipping agents and inland container coordinators, today Hapag-Lloyd deploys more than 70,000 containers worldwide.

Throughout the decade in Europe, Deutscher Container-Dienst (DCD) has coordinated inland container movements by truck and rail. More recently, in the United States, Hapag-Lloyd began offering door-to-door container transport.

On land, on the sea, in the air...Since its formation, Hapag-Lloyd has surely broadened the already wide horizons that existed ten years ago. With this same single-mindedness of purpose, the company looks forward to the future.

HARRIS BANK

In 1907 the 25-year-old investment banking firm of N.W. Harris & Company became HARRIS TRUST AND SAVINGS BANK.

The Bank, headquartered in Chicago, Illinois, is based on deposits of $4.7 billion as of December 31, 1980, the third largest Bank in Illinois and the 28th largest in the United States.

The business of the Bank is conducted in three principal areas: banking, investment, and trust.

Banking services are extended to individuals, business, governmental and institutional customers and correspondents throughout the world. The Bank's international banking services, which predominantly include foreign credits and dealing in Eurocurrencies and foreign exchange, are provided through the Bank's headquarters in Chicago, its branches in London, Singapore, and Nassau, Bahamas, representative offices in Mexico City, Sao Paulo, and Tokyo, and Harris Bank International Corporation, an Edge Act subsidiary in New York City. An international money market representative office was opened in 1980 in Los Angeles.

The Bank's investment department is a nationwide underwriter and dealer in Municipal and U.S. Government securities. This business is conducted from the Chicago headquarters and from representative offices in New York and St. Louis.

The Bank's trust department managed trust assets of $12.4 billion on December 31, 1980, placing it first among Chicago banks. Trust services are provided to individuals, partnerships, corporations and institutions. The department maintains an investment advisory representative office in West Palm Beach, Florida. The Harris Trust Company of Arizona, a subsidiary of Harriscorp, Inc., the Bank's holding company, is located in Scottsdale, Arizona, and serves customers in the U.S. Southwest.

The holding company, Harris Bankcorp, had assets of $6.904 billion on December 31, 1980. It is traded on the New York and Midwest Stock Exchanges.

Charles M. Bliss is chairman and chief executive officer of Harris Bank. B. Kenneth West is president and Robert E. Vanden Bosch, senior vice president and head of the international banking group.

HEMSCHEIDT ★AMERICA★

HEMSCHEIDT AMERICA CORPORATION, one of the world's leading manufacturers of modern shield-type roof supports for longwall mining systems used in the underground coal mining industry, has announced plans to build a manufacturing facility and United States headquarters building near Pittsburgh, PA.

The 20,000 sq. ft. structure will be located on seven acres of land in Findlay Township, in the Regional Industrial Development Corporation (RIDC) Park West, in the popular Airport/Parkway West business corridor. It will house manufacturing equipment, testing and repair facilities, a central warehouse, and general offices for Hemscheidt personnel responsible for all North American operations.

"This building project is indicative of the confidence Hemscheidt has in the growth of longwall mining in this country, in particular, and in the production of coal as a tremendous energy source, in general," said Herbert J. Rissel, corporate vice president. "In addition, we feel that a fabrication facility of this size is absolutely essential in helping us play a role as a leading supplier of equipment to the coal industry. In that regard, it will improve our delivery time and scheduling, while saving mine owners and operators freight and duty costs on equipment that otherwise would have to be shipped in from our overseas operations."

About 100 longwall mining systems are presently in operation in the United States. That number should easily double within the next five years as mining interest in the area of steam coal continues to grow and as more emphasis is placed upon metallurgical grade coal, according to Rissel. By 1985, more than 10 percent of this country's underground coal mining production could come from longwall systems, like the systems made by Hemscheidt, he added.

Ground for the new building will be broken this fall, with initial occupancy scheduled for late in 1982. When the plant goes into full production, a total of 200 people will be employed.

Hemscheidt America Corporation is a wholly-owned subsidiary of Hermann Hemscheidt Maschinenfabrik, located in Wuppertal, Federal Republic of Germany. Hemscheidt America Corporation is headquartered in Pittsburgh at Manor Oak 2 in Scott Township, and will remain there until offices are completed in the new building.

Henkel

HENKEL, headquartered in Duesseldorf, West Germany, is an international consumer and chemical specialty products company with about 100 affiliates in more than 40 countries. Worldwide sales of the Henkel Group totaled DM 7.6 billion in 1980. Around the world Henkel employs about 33,500 people.

Henkel, founded in 1876, is the largest manufacturer of detergents and cleaning agents in the Federal Republic of Germany, ranking second in Europe. Moreover, it is the largest producer of adhesives in Europe and the fourth largest chemical company in Germany. The company has made a tradition of high quality products which are safe for the consumer and the environment. In the Federal Republic alone Henkel spends far more than DM 100 million per year in the research and development area and in production and engineering to assure environmental protection and consumer safety.

Products manufactured by Henkel include detergents and cleaning agents, personal care products, household care products, institutional cleaning products and systems, adhesives, inorganic and organic chemical specialties and foodstuffs.

Over 2,000 of Henkel's employees are engaged in R&D. In the U.S. research capabilities have been strengthened considerably with the addition of the large technical center of Henkel Corporation in Minneapolis and the R&D facilities of Amchem Products, Inc.

Henkel's presence in the U.S. goes back to 1960. During the past 20 years Henkel has developed its business activities in this country and has obtained strong market positions in many of the product markets served. The U.S. operations consist of the manufacture and sale of adhesives, resins, fine chemicals, water-soluble polymers, chemical specialities for the cosmetics, mining, textile, leather industries, food ingredients and inorganic chemicals for metal treatment and the food processing industry.

On January 1, 1980 Henkel of America, Inc., New York, was founded as the parent and holding organization of Henkel's U.S. affiliates: Henkel Corporation, Minneapolis/MN, which combines the operations of Henkel Inc. and General Mills Chemicals, Inc. (acquired from General Mills, Inc. in 1977), and Amchem Products, Inc., Ambler/PA, acquired in January 1980. Also acquired in 1980 were Ross Chemical Co., Detroit/MI, a manufacturer of adhesives, and Bonewitz Chemical Services, Inc., Burlington/IA, a manufacturer of cleaning chemicals for the food processing industry.

Helaba Frankfurt
Hessische Landesbank -Girozentrale

Headquartered in Frankfurt and an integral part of the city's domestic and international banking community, HESSISCHE LANDESBANK is among Germany's top 10 banks, with total assets at the end of 1980 of DM 54.4 billion.

As a large German universal bank concentrating on wholesale banking, Hessische Landesbank offers a comprehensive program of facilities geared to the needs of big corporations, governments and government entities, and financial institutions. These facilities include:

- International financing with special emphasis on medium to long-term fixed-rate DM loans. The Bank's global lending commitments are currently spread over more than 50 countries.
- Foreign trade financing, including documentary credits, letters of credit, government guaranteed export loans, non-recourse export financing (a forfait), and international payments and

Henkel

Chemistry Working for You

Henkel of America, Inc.
600 Madison Avenue
New York, N.Y. 10022
Tel: (212) 371-0507

Henkel Corporation
4620 West 77th Street
Minneapolis, Mn. 55435
Tel. (612) 830-7831

Amchem Products, Inc.
300 Brookside Avenue
Ambler, Pa. 19002
Tel. (215) 628-1000

collections. The Bank is a member of S W.I.F.T.

- Foreign exchange dealing. not only for the Bank's customers and Hesse's Sparkassen, but also as market maker for its worldwide correspondents in spot, forward, and Eurocurrency deposits.
- Money market operations, serving central banks, other financial institutions and corporate clients.
- International capital market financings, including Euro-DM issues, publicly offered foreign currency issues, private placements, and foreign share placements.
- Investment advisory services and portfolio management. Hessische Landesbank is in permanent contact with banks and securities dealers in all major international security markets.
- Euromarket financing and services through its wholly-owned Luxembourg subsidiary Hessische Landesbank International S.A., full-service branches in New York and London. These facilities abroad and an active global network of correspondent banks provide Helaba's clients with the full scope of international services.

Hessische Landesbank acts as banker to the State of Hesse and performs clearing and other centralized services for Hesse's 52 regional Sparkassen, both of which are its shareholders.

PHILIPP HOLZMANN
Aktiengesellschaft

PHILIPP HOLZMANN AG began as a family business before developing to its present significance as a Company with a world-wide reputation in the construction industry. The Company, founded by Johann Philipp Holzmann in 1849, was at the beginning mainly involved in railway construction. Business was soon extended to all areas of building and heavy construction.

Today Holzmann is one of Germany's leading industrial undertakings and is ranked among the top international construction companies.

Domestic business is dealt with by the parent company at eight main branches, which have sole responsibility, 24 auxiliary branches and a General Contractor's division at the Central Administration for turnkey construction. The technical divisions at the Central Administration back up the sectors involved in construction.

20 subsidiary companies are employed in the specialized field of precase element construction, prefabricated housing, special heavy construction, foundation and waterway construction, road construction, also consulting and offshore work, natural stone quarrying and housing administration.

At the international level HOLZMANN ranks with its volume of construction among the major companies in the industry. In 1980, projects weere carried out in 24 countries under the unified supervision of the HOLZMANN group. The subsidiary companies, whose activities as yet have been confined to Germany, are taking over an ever increasing number of contracts abroad.

The widely dispersed geographical locations of the Company's activities are conducive to stability and growth. Almost two-thirds of HOLZMANN's construction performance takes place outside the Federal Republic of Germany.

The Company has been working in other European countries as early as 1882. The first contract in 1893 for railway construction in Asia Minor marked the beginning of the HOLZMANN tradition in the Near and Middle East. The acquisition of the J.A.JONES CONSTRUCTION COMPANY, Charlotte, NC, and of the LOCKWOOD GREENE ARCHITECTS/ ENGINEERS, Spartanburg, SC, extended the sphere of successful international activity to the American Continent.

KIENBAUM INTERNATIONAL INC. opened in New York in March, 1979. This company is the U.S. base of the Kienbaum Two-Way Service, assisting:

- German companies in their ventures in the U.S. market and
- American business in German-speaking countries.

Kienbaum's services are designed not only for companies planning to invest in or export to a foreign market, but also for those that have already invested and require assistance in day-to-day problems, in securing the future, in crisis situations or in start-up operations.

The Two-Way Service acts as a coordinating interface between the investor and the foreign country where, generally speaking, a similar economic system may prevail, but where the details may differ considerably.

Looking into Germany in 1981, for example, business faces a tough situation, reflected by

- little growth
- increasing labor costs
- no investment incentives
- aggressive foreign competition
- and the effects of co-determination.

Also American multi-national companies can think of better times while evaluating the performance of their German subsidiaries. Cutting down overhead and indirect expenses (Gemeinkostensenkung) increasingly becomes the #1 priority.

Since immediate results are requested, it takes too long for a company to develop personnel and know-how from within. Outside assistance becomes more practical and economical. Executives finding themselves in the situation described above will be interested to learn about Kienbaum's GSE program which is—simply expressed—an approach to cut overhead expenses without having to fire personnel.

The instruments of GSE are:

- identification of cost-effectiveness-disparities and subsequent reduction, also in administration
- adjustment of personal and organizational structures towards participational work simplification
- challenging overhead rates in respect to their origin

Through experience from completed assignments, GSE achieved reductions ranging from

9 - 24% in personnel
6 - 21% in overhead expenses
.5 - 3% of annual sales

We chose this example because of its current significance. Other services provided within the Kienbaum Two-Way Service are market and product related consulting and executive search on an international basis. Inquire for details at

Kienbaum International, Inc.
30 Rockefeller Plaza
Suite 5450
New York, NY 10112
Tel. (212) 977-4480

KLOCKNER-MOELLER CORPORATION is a specialist in the low voltage industrial motor control field and is a subsidiary of the Klockner-Moeller Elektrizitaets GmbH in Bonn, a recognized market leader in West Germany. K-M Corp. combines experience, sound engineering practices and customer service in promoting their full line of quality

electrical and electronic equipment. This includes motor control center, main distribution boards, circuit breakers, interruptors, fusible disconnect switches, motor starters, heavy-duty pushbutton units and pilot devices, control relays, and limit switches, engineered custom control panels, as well as solid state industrial relays and microprocessor-based freely programable controllers. Its products are designed and tested to meet all pertinent national and international electrical equipment manufacturing standards.

A unique decentralized corporate structure enables K-M to provide its customers with direct access to first-rate technical expertise and service. It has established seven independently operating factory branches strategically located across the U.S.A.

Every branch is a fully integrated production and assembly facility which handles the full line of K-M products and features complete engineering and design capabilities. Customer requirements are then met quickly and efficiently. Customer service is not restricted to this country but is extended world-wide in over sixty-eight countries, where K-M subsidiaries are located.

Klockner-Moeller Corporation locations in the U.S.A. are as follows: Fairfield, New Jersey; Atlanta, Georgia; Chicago, Illinois; Houston, Texas; Tulsa, Oklahoma; Los Angeles, California; and San Francisco, California.

GK

GEBRUEDER KULENKAMPFF, founded in 1806, is an international trading company with a world-wide network of subsidiaries, branches and agencies.

In the 175 years of our existence, we have acquired a leading position in our main import activity, leaf tobacco, as one of Europe's most recognized companies. Gebrueder Kulenkampff is still privately owned and with annual sales exceeding U.S. $120 million, we rank among the leading trading houses within the Bremen business community.

In the field of technical products we have gained a reputation as specialized exporters of machinery, parts and supplies to the minerals, energy, construction and transport industries.

We provide international cement manufacturing companies, underground and open pit mines, mine supply houses, construction equipment distributors, manufacturers and distributors with machinery, process equipment, supplies, diesel parts and a complete range of wear parts. Our specialized parts supply system is aimed at those international mills, mines and processing plants in need of genuine OEM parts, but which find their present purchases too costly. For the cement and mining industry we also render consulting, erection and commissioning services.

In addition to fifteen active international subsidiaries serving our tobacco interests, we have affiliated companies in New York, Montreal and London, as well as agencies in Nairobi, Johannesburg and Sydney for technical sales support.

GK also has a financial interest in INTERTRAC, Gevelsberg, Germany, with a workforce of 800, annual sales of more than U.S. $100 million, manufacturers of crawler undercarriages, OEM suppliers to the world's leading construction and mining equipment manufacturers.

FRIED. KRUPP GmbH of Essen, Germany, with a world-wide reputation as a leader in industrial technology and engineering excellence, has a long-standing commitment to service the US market.

Among Krupp subsidiaries and affiliated companies established in the US are the following:

Krupp International, Inc. of Harrison, N.Y. is active predominantly in the fields of bulk materials handling, metallurgical plants, rolling mill installations, and cranes; all of these designs are based on the renowned technology of Krupp Industrie- und Stahlbau.

Krupp Atlas Elektronik's Radar Installations for ships and vessels, their Collision Avoidance Systems, and their well-known Fishfinders, using sonar technology, are based on entirely different applications of Krupp's know-how. Their Nuclear Medicines Computers have helped in relieving pain in many thousands of patients by assisting physicians in reaching the correct diagnoses. Krupp Atlas Elektronik also handles the US market via Krupp International Inc.

Krupp Steel Products and Krupp Specialty Steel supply the complete range of carbon, alloy and stainless steel grades in shapes and sheets. Forgings go to various US industries.

Polysius Corporation of Atlanta, Georgia, transfers the most modern Cement Plant technology to the US market.

Krupp Mak Diesel Inc., of Rosemont, Illinois is marketing the product lines of Mak in Kiel, Germany, predominantly Diesel engines for all types of ships, as well as for Diesel powered generating plants.

LEHNDORFF

The LEHNDORFF GROUP OF COMPANIES is an integrated group of entities organized for the purpose of owning and operating income-producing properties in the United States and Canada.

Over the past 15 years, Lehndorff has become a leader in providing safe, effective and tax conscious property investment in North America.

In August 1965, a German private limited company, Lehndorff Vermoegensverwaltung, was founded as nucleus and general partner for a series of German limited partnerships, whose objective was to invest in North American real estate.

Originally, Lehndorff purchased only existing, income-producing property in Canada. The first limited partnership in the United States was formed in late 1969, and since 1970, Lehndorff has had its own American management organization. Originally based in Chicago, Illinois, the United States headquarters for Lehndorff moved to Dallas, Texas in 1978 to take advantage of the growing investment possibilities the sunbelt region of the United States had to offer.

The United States operations have grown to include regional offices in six states, including three offices in the state of Texas.

Over the past 15 years, Lehndorff has created a diversified product line of urban income-producing real estate and farmland in the U.S. and Canada, offering a great variety of geographic locations. With assets totaling over $1.2 billion, no European investment group is as broadly based in the U.S. as Lehndorff.

Important economic considerations have influenced many U.S. companies to locate their overseas operations in LOWER SAXONY, WEST GERMANY. The main reasons are based on productivity, long-term growth and stability. First of all, Lower Saxony offers an abundance of highly motivated employees at all skill levels. Manufacturers of machine tools and intricate components such as those used in

computers, as well as the large steel and chemical producers, have all found a ready and exceptionally high quality labor force.

For instance, commenting on the favorable factors that led Dow Chemical to construct a plant in Lower Saxony, Wolfram P. Rittershausen, General Manager, Dow Chemical, Germany, explained: "Who runs our plant so successfully? The answer: our workers, of course. And we are proud of them. Building a new, modern chemical plant is only the first step to success. The employees see to it that it runs smoothly and that it can produce."

There are a number of other reasons why Lower Saxony has long led the world in productivity and growth over the past decade, including the fact that strikes and labor unrest are virtually nonexistent. Compared with the constant labor and political upheavals in other European countries, Lower Saxony has managed to demonstrate long-term stability in both respects.

Considering that trade stoppages and political turmoil have been a stigma to U.S. investments all around the globe, any foreign country that can offer even some measure of stability will attract the attention of expanding international firms.

The other fact that has contributed to the continued interest in Lower Saxony is profitability. The remarkable achievements of the first U.S. firms to locate there have begun to leak out. Companies such as United States Steel, Westinghouse, Mobil Oil Corp., Walter Kidde & Co. and Diamond International Corp. have set productivity records that far exceed their expectations.

Lower Saxony, with its capital of Hanover, site of the world's largest industrial fair, is centrally located in the heart of Western Europe. Its deep-water port on the North Sea provides easy access to the world's shipping lanes, and modern rail, highway and air transportation networks link it to all European countries.

In order to acquaint U.S. companies with the advantages of establishing their overseas operations in Lower Saxony, the Lower Saxony Liaison Office was established in the U.S. An information package is available upon request by writing to: Lower Saxony Liaison Office, P.O. Box 338, Whitehouse, NJ 08888; or call toll-free (800) 526-5978, in New Jersey (201) 534-9044.

The Lower Saxony Liaison Office will offer complete information to facilitate U.S. firms' decisions to locate their overseas operations in Lower Saxony. This office will also assist in establishing all necessary contacts with Lower Saxony officials so that U.S. companies may directly discuss their investment plans, availability of state government incentives and site selection criteria.

Lufthansa

LUFTHANSA GERMAN AIRLINES achieved a modest profit in 1980, despite the year's record as the worst in the history of commercial aviation. The overall corporate profit was 6.7 million German marks ($3.41 million) compared to a 1979 profit of 78.2 million marks ($45.1 million).

Net profit, after special depreciation deductions of 1.1 million marks ($560,366), was 5.55 million marks ($2.83 million). The company's net profit was 67.5 million marks ($38.9 million) in 1979.

Lufthansa's passenger traffic figures for 1980 also showed modest increases. The airline transported 13,943,853 passengers during the year, up 1.5 percent over 1979. Revenue passenger kilometers increased 5.5 percent to 21.1 billion.

Revenue for flight operations in 1980 was 5.369 billion marks ($2.735 billion), while expenditures reached 5.484 billion marks ($2.794 billion). The operational loss of 114.9 million marks ($58.5 million) compares to a 1979 profit of 24.8 million marks ($14.3 million).

Flight operations costs increased by 924 million marks ($471 million), of which fuel alone accounted for 491 million marks ($250 million). The airline's total fuel bill for the year increased 61 percent over 1979, although the amount of fuel consumed was up only 3.1 percent. Fuel expenditures for 1980 were 1.3 billion marks ($662 million), 23.4 percent of total operating costs.

Other operating revenue—particularly from technical services, catering, ground handling and flight training—increased 16.3 percent to 88.5 million marks ($45.1 million). Non-operating revenue totaled 33.1 million marks ($16.8 million) compared to a loss of 14 million marks ($8.1 million) in 1979 and contributed substantially to the airline's final profit figures. The company paid a five percent dividend on preferred shares for 1980, but no dividend on common shares.

In the first six months of 1981, Lufthansa transported 6,780,512 passengers, 0.5 percent fewer than in the same period of 1980. Revenue passenger kilometers, however, increased by 3.1 percent. Cargo at 198,154 metric tons was down 0.2 percent, but cargo ton kilometers at 762.1 million increased 1.6 percent. Total ton kilometers offered increased at the same level as ton kilometers sold so that the revenue load factor remained unchanged at 60.5 percent.

San Juan, Puerto Rico and Manila, capital of the Philippines, were new destinations in 1981. Nonstop service between Dallas/Ft. Worth and Frankfurt, and between Miami and Dusseldorf were other new additions this May. With the introduction of the nonstops to Dallas/Ft. Worth, Lufthansa also began service connecting the Texas gateway to Mexico City.

In April of this year, Lufthansa learned it was voted best for business travel of the 20 most recommended airlines in the world in a survey conducted by The Annual Investment File, a British business publication. The 1981 annual, published in the spring, revealed that Lufthansa came in first, Swissair second and American Airlines third. The international airport voted the most efficient and well run was Frankfurt's Rhein/Main.

America's Finest Afloat
LYKES LINES
an LTV company

LYKES BROS. STEAMSHIP CO., INC., a subsidiary of The LTV Corporation, operates a fleet of 46 U.S.-flag ships on trade routes covering five continents and serving the U.S. Gulf, West and South Atlantic coasts and the Great Lakes and St. Lawrence Seaway.

The company got its start at the turn of the century, when the sons of Dr. Howell Tyson Lykes began shipping cattle from Tampa, Florida, to Cuba in sailing schooners. From those beginnings, Lykes has grown steadily to its current position as one of the world's leading ocean carriers.

Lykes' trade routes extend from the U.S. to Europe and the United Kingdom, the Mediterranean, South and East Africa, the West Coast of South America, and the Far East and Southeast Asia.

Northern Europe and the U.K., which Lykes began serving in the 1920s, are served by Lykes' innovative barge, container and heavy-lift carriers, the SEABEEs. Each SEABEE ship can carry as many as 38 barges, as well as several hundred containers. The barges are lifted aboard ship on a 2,000-ton-capacity hydraulic elevator. Containers can be handled by efficient shoreside gantry cranes.

The SEABEE system comprises three 38,000-deadweight-ton "mother ships," 243 hopper barges, four temperature-controlled chill barges for perishables, and three flat-deck barges which are specially reinforced for heavy and oversized cargo.

The other ships in Lykes' Fleet are five roll-on, roll-off ships and 38 conventional vessels in five classes. All ships in the Lykes

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DYNAMIT NOBEL OF AMERICA INC.
105 Stonehurst Court, Northvale, New Jersey 07647
Phone: (201) 767-1660 Telex: 134-405

fleet are equipped to carry containers. Lykes, based in New Orleans, has offices in major U.S. ports and in Antwerp, Bremen, Callao, Durban, Genoa, Hong Kong, London and Tokyo. In addition, Lykes is represented by agents in dozens of other cities worldwide.

M·A·N

M.A.N. MASCHINENFABRIK AUGSBURG-NUERNBERG AG with its subsidiaries forms one of the leading mechanical project and automotive engineering companies. With 46,000 employees, it offers capital goods and services for various important industrial sectors: basic industries, power engineering, transport engineering, communication, civil engineering, and industrial equipment.

The intensive efforts invested in innovation and future-oriented projects—be it for nuclear components, space exploration, transportation systems or new materials—are aimed at continuing M.A.N.'s leadership in engineering (the world's first Diesel engine was developed at M.A.N. in Augsburg in 1893—1897).

M.A.N. comprises five production divisions and the Advanced Technology Division:

Commercial Vehicle Division

The plants in Munich, Penzberg, Salzgitter, and Brunswick build trucks, buses, and municipal vehicles. In the United States M.A.N. has founded a sales company, M.A.N Truck and Bus Corporation in Southfield, Michigan, and a factory for the assembling of articulated buses in Cleveland, North Carolina.

Diesel Engine Division

The Augsburg parent plant concentrates on manufacturing and selling of M.A.N.-B&W Diesel engines with an output range of 400 kW to 34 800 kW (B&W Diesel A/S, Kopenhagen, is a 99.5% subsidiary of M.A.N.). The Hamburg plant, with its own quay, offers marine diesel engine maintenance and repair as well as spare parts service worldwide. This plant is an authorized repair center for B&W Diesel engines.

Mechanical and Structural Engineering Division

The plants in Nuremberg and Gustavsburg produce equipment for power generation, material handling, cranes, hydraulic presses, steel structures, pumps, elevators and escalators, rolling stock, stampings, and construction services of complete plants and manufacturing facilities.

Division GHH Sterkrade

This division specializes in building plants and equipment for mining and the production of iron and steel. The production program also includes turbocompressors, screw-type compressors, industrial steam turbines, components for nuclear technology, floating docks and special purpose inland and ocean-going ships.

M.A.N.-Roland Druckmaschinen AG

The products and services of this division with plants in Offenbach and Augsburg: Single and multi-color sheet-fed offset-presses; web rotary presses for offset, rotogravure and letterpress; stereotyping machinery. The American printing press manufacturer WOOD Industries, Inc., Middlesex, was acquired by M.A.N. in 1979 and was renamed "M.A.N.-WOOD Industries."

Advanced Technology Division

Future-oriented research projects are carried out in Munich with main efforts in the fields of energy, environment, raw materials; components for nuclear technology, electronics, space exploration, transportation, and material technology.

Outside Germany, M.A.N. is represented by a network of subsidiaries and individual agencies for consulting, sales and service. In the United States the company has founded the American M.A.N. Corporation with offices in New York, San Francisco and Houston. It is also represented by Ferrostaal Corporation in New York and San Francisco.

Further details about M.A.N. may be obtained from the annual report, available in English from M.A.N., Abt. GMI, Stadtbachstrasse 1, D-8900 Augsburg, West Germany.

Main Hurdman

MAIN HURDMAN is a major full-service U.S. accounting firm with 500 partners in 80 offices throughout the country. Its diversified client list includes some of the largest U.S. industrial companies.

In 1979 Main Hurdman greatly expanded its international capabilities by becoming the U.S. founding member of Klynveld Main Goerdeler (KMG), which is among the five largest accounting firms in the world. Its close working relationship with **Deutsche Treuhand-Gesellschaft**, KMG's prestigious founding member in Germany, makes it especially well qualified to provide accounting-related services for German-based companies doing business in the United States and for U.S. firms with interests in Germany.

Auditing Services: Main Hurdman is skilled in the examination of financial statements prepared in response to U.S. or German reporting requirements, and attuned to the needs of the regulatory authorities and financial institutions in both countries.

Tax Services: The firm's wide range of tax services include tax planning; advice and assistance in complying with local, national and foreign tax laws; assistance in dealing with tax authorities, and counseling on tax problems of individuals and corporations. Its fiscal expertise extends to other tax-related areas such as mergers and acquisitions, transfer pricing, expatriate tax services, forms of business organization for multinational entities, offshore financing and operating in duty free zones.

Management Consulting Services: Main Hurdman's consulting services are designed to assist management by providing professional counsel in disciplines where internal expertise is not available. They include advice on designing and implementing management information and financial reporting systems to meet subsidiary and parent company requirements, designing electronic data processing applications, budgeting, production planning, inventory control and project planning.

Main Hurdman's higher-than-usual partner-to-staff ratio guarantees close personal attention by partners to each client's needs. All professional services are performed under the constant direction of an engagement partner, who can draw upon the full resources of the firm, including its national and international tax expertise. For U.S. branches or subsidiaries of German companies, the engagement partner has the additional support of several KMG—*Wirtschaftspruefer* on assignment in the National Office of Main Hurdman.

This is the MANNESMANN logo. Originally, it was symbolic of the pioneering ventures of the Mannesmann brothers who invented the seamless pipe-making process. Today it stands for a company that produces a complete range of tubular products with its own steel-making facilities, builds machinery and manu-

facturing systems and trades worldwide in its own as well as external products.

The following Mannesmann companies offer the know-how, the experience and the capacity of a large corporation.

Mannesmann Pipe & Steel Corporation, Houston, is a vital and experienced marketing organization. Its product range covers steel pipe, sophisticated tubular products and components, rolled steel products, as well as coke and coal. From its five strategically located sales offices, trained specialists provide advice on a comprehensive array of technical-economic questions.

For more than 20 years **Mannesmann Demag Corporation,** Cleveland, has been marketing and servicing systems, projects, machinery, and component products from its American bases. It supplies the steel industry with furnaces, converters, continuous casting plants, rolling mills and forging equipment. It also manufactures material handling equipment and construction machinery as well as process compression and compressed air equipment. Experienced sales and service technicians operate from centers in nine major markets in the USA and Canada. An extensive dealer network operating in the other key locations completes the service organization.

The Rexroth Corporation, Bethlehem, Pa., also a Mannesmann company, is a well-known international supplier of hydraulic systems and components. Applications for its products are found in every sector of industry.

American Lohmann Corporation, Hillside, N.J., is a company of 110 employees engaged in the design and manufacture of gear transmissions for high speed, high horsepower industrial aircraft and marine applications. Previously known as Aero Gear Corporation, it holds a 30-year reputation as a quality manufacturer of precision transmissions.

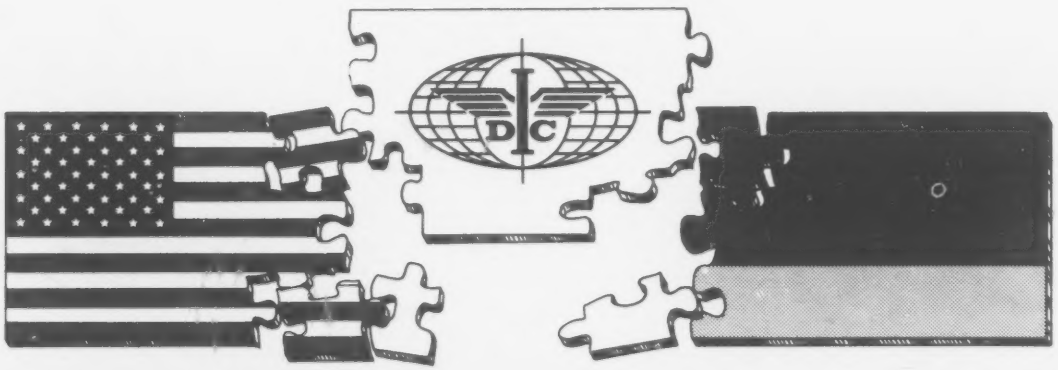
Mannesmann Tally Corporation, Kent, Wash., has been a premier supplier of computer peripheral equipment and data communications products for over thirty years. The company stresses highly reliable products and is now the foremost supplier of matrix line printers and serial printers to satisfy the growing demand for printers ranging in speed from 50 to 500 lines per minute.

Mannesmann International Alloys, Inc., Sugarland, Texas, established in late 1972, is an experienced stocking distribution organization. The company maintains large inventories of carbon and alloy steel tubular products for the power and processing industry. Trained personnel provide prompt and efficient service for customer requirements.

MANUFACTURERS HANOVER TRUST, a major international bank based in New York, with over $50 billion in assets and a worldwide network of over 100 strategically located offices, subsidiaries and affiliates in 40 countries around the world, is a wholly-owned subsidiary of Manufacturers Hanover Corporation. The ability to marshal large amounts of financing on a worldwide scale has made Manufacturers Hanover an important lender to corporations, banks, governments and government agencies worldwide.

The Bank's International Division provides a wide range of services including depository facilities, export-import trade financing, as well as regular commercial loan and credit accommodations, funds transfer, cash management and foreign exchange services. The Corporation's foreign loan portfolio of $14.3 billion is well diversified geographically, with broad representation in Europe, Asia, Latin America and the Middle East.

For international customers interested in U.S. investments the Bank offers money market instruments, coupon and bond collections, portfolio management and securities safekeeping services including



Combining resources and innovation is a challenging task.

Daniel has met this challenge time after time — designing, building and maintaining facilities in Europe and the United States.

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A Division of Daniel International Corp.
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Representation in Europe:
Daniel Construction Co. International
Marketing Europe
Alwinenstrasse 24
P. O. Box 2020
6200 Wiesbaden, West Germany
Telephone: (06121) 39631
Telex: 4186267

Geopac—Manufacturers Hanover's total electronic securities system for immediate and accurate reporting, processing and settlement of securities transactions.

In West Germany, Manufacturers Hanover Trust Company operates full service branches in Frankfurt, Hamburg, Hannover and Duesseldorf, and representative offices in Frankfurt and Munich. Manufacturers Hanover's German offices concentrate on the local market, but also work with multi-national corporations in all phases of commercial banking including export financing and buyers credits.

As the first Western bank to open a branch in Eastern Europe, Manufacturers Hanover's Bucharest Branch specializes in international commercial services related to East European trade and economic development and is uniquely qualified to give advice and assistance to corporations pursuing business opportunities in Romania.

The Bank's traditional lending activities have expanded into leasing, factoring, consumer finance, mortgage banking, industrial and personal installment loans, export financing, investment management, real estate and trust.

In 1981 the DAIMLER-BENZ AG strengthened its presence on the American scene by acquiring Freightliner Corporation, the well-known manufacturer of heavy-duty trucks, from Consolidated Freightways. Freightliner holds a more than 10 percent share of the U.S. heavy truck market, ranking fifth among American manufacturers of this type vehicle.

Freightliner Corporation is the second major Daimler-Benz U.S. acquisition in recent years. In addition to extensive manufacturing facilities, this acquisition gives the company a coast-to-coast heavy truck dealer, parts and service network. In 1978, Daimler-Benz acquired Euclid, the Cleveland-based manufacturer of off-highway heavy haulers.

In addition to Freightliner and Euclid, Daimler-Benz—the world's oldest automaker—has three other subsidiaries in the U.S.: Mercedes-Benz of North America (MBNA), distributor of Mercedes-Benz passenger cars, medium-weight trucks and the versatile Unimog to the U.S. market with headquarters in Montvale, N.J.; Daimler-Benz of North America (DBNA), importer of Mercedes-Benz products, and Mercedes-Benz Service Corporation (MBSC), which conducts exhaust emission tests in laboratories in Michigan and Colorado.

Since 1980, Mercedes-Benz of North America has operated a truck assembly plant in Hampton, Va., with an annual capacity of 6,000 units assembled from semi-knocked-down (SKD) truck kits imported from Mercedes-Benz of Brasil, and from U.S.-sourced parts.

The Daimler-Benz subsidiaries in North America employ approximately 8,500 persons. This includes Freightliner's 5,500 employees who work in the firm's headquarters and two manufacturing plants in Portland, as well as in additional plants in Indianapolis; Mount Holly and Gastonia, N.C.; Fremont, Calif.; Vancouver, B.C.; and the seven Consolidated Metco plants which produce lightweight aluminum and zinc castings and structural foam components for automotive applications. MBNA has some 1,700 employees and Euclid has approximately 1,300 persons in its organization.

MBNA, until recently the largest Daimler-Benz U.S. subsidiary, was organized in 1965. It has a sales and service network comprised of seven zone offices for passenger cars (Montvale, Chevy Chase, Md., Jacksonville, Houston, Chicago, Los Angeles and San Francisco); four zone offices for commercial vehicles (Montvale, Jacksonville, Houston and Chicago); seven vehicle preparation centers (Newark, Baltimore, Jacksonville, Chicago, Houston, Los Angeles and San Francisco); six parts distribution centers; five passenger car and two commercial vehicle service training centers, and two company-owned retail stores (Manhattan and Hollywood).

Passenger cars are imported through Newark, Baltimore, Jacksonville, Houston, Los Angeles-Long Beach and San Francisco, and trucks through Newark, Jacksonville, Norfolk and Houston.

The MBNA distribution network at the end of 1980 included 410 passenger car dealers and 170 truck dealers.

This is a long way from the beginnings of Daimler and Benz in America, which can be documented back to 1888--or eight years before Henry Ford's famous Quadricycle.

In that year, Gottlieb Daimler signed an agreement with the American piano manufacturer, John Steinway, to have Steinway build Daimler's engines in the United States. From 1905 to 1907, after producing light trucks for several years, Steinway's company built cars in its Long Island City, New York plant. They were called "American Mercedes" and used parts imported from Germany along with parts of American manufacturers.

In 1980, by way of comparison, MBNA dealers sold 53,000 passenger cars and 4,051 trucks. Worldwide production of Daimler-Benz totalled 429,078 passenger cars and 272,868 commercial vehicles, and resulted in consolidated sales of DM 30.7 billion.

MBNA and DBNA made a direct contribution to the American economy in the form of taxes, customs duties and payrolls of approximately $130 million in 1980.

Founded in 1881 by a citizen of Frankfurt named Wilhelm Merton, METALLGESELLSCHAFT's (referred to here as "MG") initial field was trading in non-ferrous metals and their ores. Against a background of rapidly increasing demand for metals at the end of the last century, occasioned by the impetus of industrialization, the company successfully established an international metals exchange and secured a strong position in it. However, under the leadership of its far-sighted founders, the company was always alert to opportunities in other fields of activity as they developed.

During the course of its colorful history, MG has progressively expanded its geographical, operational and technical range by setting up new subsidiaries and through acquisitions, mergers and participations.

Now MG is one of the leading concerns in West Germany's highly industrialized economy, still concentrating mainly on the metals industry, i.e., ore mining, metallurgy and the processing of non-ferrous metals. The company's activities, however, are not restricted to any one specific industrial category. Its hallmark is versatility: MG is well known in such important and diverse fields as industrial plant installation, marketing of technical processes, transport and chemicals manufacturing.

MG's trading in raw materials, which was originally confined to metals and ores, today involves a number of other commodities including sulphur, phosphates, fluospar, alumina and rubber.

The acquisition, production and distribution functions of the company made it necessary to develop its own fully integrated transport and insurance services. The financial transactions of MG, conducted on an international scale, are carried out by its own bank.

With 100 years of activity in metallurgy—prospecting, exploring, financing, metals production, transport, processing and

marketing—the MG Group has accumulated a vast reserve of experience for future ventures in the world of metals.

Today MG is one of the world's leading producers of non-ferrous metals and is a ring dealing member of the London Metal Exchange. It offers a wide range of its own non-ferrous, semi-finished metals, and is an important supplier, via the worldwide Lurgi network, of processing technology for the solution of such current problems as energy utilization, recycling, environmental protection and raw materials exploitation. MG is also assuming an active role in ocean mining technology for the prospecting and extraction of mineral ore deposits from the ocean floor. The subsidiary, Urangesellschaft, assists in the supply of uranium ores.

Finally, it should be added that Metallgesellschaft, with a turnover in 1980 of DM 10 billion, and 30,000 employees, ranks as one of Germany's largest industrial concerns. The newly founded Metallgesellschaft Corp., Wilmington, concentrates its activities on the natural resources area and on activities related to the various corporate divisions of Metallgesellschaft.

Milwaukee / America's best managed city.

MILWAUKEE ist in den gesamten Vereinigten Staaten fuer seine Stabilitaet, soliden Finanzen und Gemuetlichkeit bekannt. Es ist eine Stadt der Fontaenen, Festivals und Freundlichkeit. Es gibt genuegend Wasser, eine Vielzahl von ausgebildeten Arbeitskraeften und eine Stadtverwaltung, die mit Geschaeften und Industrie zusammenarbeitet.

Das industrielle Zentrum der Stadt bilden zehn Unternehmen, die zu den groessten amerikanischen Produktionsunternehmen zaehlen. Weitere Unternehmen sind in der Umgebung der Stadt angesiedelt, um so dem Grossraum Milwaukee eine industrielle Mischung und Diversifizierung zu verleihen, die das Beschaeftigungsgleichgewicht aufrecht erhaelt.

Die Standorte der Stadt wurden den Beduerfnissen der Unternehmen, die sich hier ansiedeln wollen, voll angepasst. Und sie liegen nur Minuten von Milwaukees Finanzzentrum, wo sich drei der groessten amerikanischen Bankholdinggesellschaften und Immobilientrusts befinden. Einflussreiche Versicherungsgesellschaften, traditionsreiche Spar- und Kreditinstitute und fortschrittliche Investmentfonds runden die wirtschaftliche und finanzielle Bestaendigkeit ab.

Fachleute fuer Wirtschaftsentwicklung werden Ihnen bei der Finanzierung mit Industrieobligationen behilflich sein. Eine Aussenhandelszone steht Ihnen zur Verfuegung. Und Sie koennen sich gut funktionierender Transportmittel zu Lande, See oder in der Luft bedienen. Gleichgueltig, welche Zulieferbeduerfnisse Sie haben, wir koennen sie fuer Sie erfuellen.

Kommen Sie nach Milwaukee, wir warten auf Sie. Fuer naehere Auskuenfte, wenden Sie sich bitte an:

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Mobay Chemical Corporation

MOBAY CHEMICAL CORPORATION's success in the United States derives largely from the company's ability to be a strong technical partner to American industry and agriculture. This approach to business reflects the philosophy of Mobay's parent company, Bayer AG, that the sophistication of the American market demands high-technology products tailored **to this market.**

From small beginnings in the 1950's, Mobay has developed into the undisputed leader in polyurethane raw materials and polymers, technology, service and equipment. It is also a leading force in the areas of agricultural chemicals, dyestuffs and pigments, thermoplastics and industrial chemicals. Net sales in 1981 were expected to reach $1.3 billion, up from $1.07 billion in 1980. The gains in sales came from all of the company's divisions. Since Mobay's last report in this survey, the company has taken several important steps to broaden its product lines. Domestic manufacture now includes inorganic and organic pigments, paper dyes, sulfur dyes, ABS plastics and a new line of polyurethane coatings.

Headquartered in Pittsburgh, Pa., Mobay provides jobs for about 6,300 people throughout the United States. The company's seven divisions are: the Agricultural Chemicals Division, the Inorganic Chemicals Division, the Organic and Rubber Chemicals Division, the Plastics and Coatings Division, the Polyurethane Division, the Dyes and Pigments Division, and the Fibers Division. The divisions' principal manufacturing facilities are based in Baltimore, Maryland; Bayonne, New Jersey; Baytown, Texas; Charleston, South Carolina; Irvine, California; Kansas City, Missouri; New Martinsville, West Virginia; and Newark, Ohio.

NEOPLAN USA

AUWAERTER/NEOPLAN bus builders in Stuttgart, West Germany since 1935 started production in a newly constructed plant in Lamar, Colorado. This is the first new bus plant in the United States for many years; and the first production facility for a German bus company.

NEOPLAN has three production plants in Germany and one in Ghana, West Africa. The entry into the U.S. market started several years ago with the sale of several buses to private and public transit operations. However, the decision to produce was made when their U.S. representatives, Rolf Ruppenthal and Associates, secured an order for 50 transit buses in Atlanta, Ga. In the meantime, the U.S. company has a backlog of over 300 buses.

The decision to locate in Lamar, Colorado was made after extensive studies determined the site to be near the geographical center of the United States. This facilitates the shipment of buses to any location in the U.S. Another reason is the work ethic and enthusiasm of this rural community, which already results in a superior quality product.

The plant employs only a handful of German specialists. Some of the work crew were trained in Germany, and the local community college started a training course for the plant employees that was patterned after the training program (Lehre fuer Busbauer) in Pilsting, Bavaria.

The first buses are running in Atlanta, and a follow-up order for articulated buses indicates the good cooperation between the manufacturer and the transit operator.

The bus market in the U.S. is very competitive and all contracts are awarded to the lowest bidder. The advantage for NEOPLAN is their ability to adapt to the special requirements of the different markets within the U.S., which are determined by climatic, and other differences. The bus for Atlanta has different requirements than the bus for Milwaukee.

Another advantage is the fact that the company can apply the long experiences and technical developments of bus building. In contrast to the United States, where mass transit had a decline for about 30 years, the European buses advanced steadily during this period.

NEOPLAN uses almost entirely U.S. manufactured products in their buses. This gives the buyers the advantage of familiarity with engines, transmissions, etc.

How does the company look at the future? States Rolf Ruppenthal, Marketeer for NEOPLAN: "We will see other manufacturers enter the market. The competition will increase with the increase of the market. However, the purchasers will become more demanding. They will require efficiency in operation, maintenance and higher comfort for their ridership. NEOPLAN has the plus to custom built buses and will therefore become a strong competitor in the U.S. market."

NRW
Gesellschaft für Wirtschaftsförderung in Nordrhein-Westfalen mbH

Before you invest, investigate. We're there to help you. The old rule is truer than ever: Before you set up a new plant, you need to know about the most advantageous locations, about industrial properties and property prices, transportation facilities, utilities, waste disposal, local tax rates, available labor, public investment aid, and a host of other matters.

In North Rhine-Westphalia (NRW for short), the most populous state in the Federal Republic of Germany, a highly specialized consulting service is available to answer such questions: GfW, GESELLSCHAFT FUER WIRTSCHAFTSFOERDERUNG IN NORDRHEIN WESTFALEN MBH (Economic Development Corporation for North Rhine-Westphalia Ltd.), at Kavalleriestr. 8-10, D-4000 Duesseldorf. More than 5,500 companies so far have drawn on the comprehensive knowledge of this organization.

The company's experienced consultants know what's important. They know the country like the back of their hand; they know the key people and the proper channels. Their information and counsel are individual and strictly confidential. They suggest locations, locate properties, provide figures and contacts. They are fast and anything but bureaucratic. And they cost the client nothing. The State of North Rhine-Westphalia bears the entire expense. The Minister of Economic Affairs of the state is chairman of the GfW board.

In short, nobody knows NRW better than GfW. Nobody has more know-how, know-where, and know-who.

Reason enough, surely, to call on the NRW specialists before you invest in North Rhine-Westphalia.

NEW YORK STATE

A balanced economy, excellent financial incentives and a productive labor force combine to make NEW YORK STATE the best place to do business in America.

The State is home to an array of businesses and industries that include everything from manufacturing to agriculture, while the city of New York functions as the world's capital of international commerce and finance.

New York's hospitality to business is

further enhanced by recent substantial reductions in both corporate and personal income tax. These cuts have totalled over $2.5 billion, the largest tax reduction in the State's history.

In addition to its tax incentives, New York State encourages business expansion and investment through the many services offered through the New York State Department of Commerce. Marketing, tax and financial profiles, energy rates and availability information, site selection services, and transportation analyses are all available—at no cost—to interested firms. In addition, specially trained ombudsmen cut bureaucratic red tape for businessmen and make their personal and immediate assistance available for launching business projects. Says State Commerce Commissioner George G. Dempster: "Our departmental staff can give a new business or an expanding business, whether U.S.-based or foreign, all the information needed for a location decision."

The benefits of doing business in New York are based largely on the State's stable and productive labor force. Statistics for the past decade show that the State's record of labor stability is superior to that of other comparable industrial states in the U.S. Furthermore, New York ranks second in productivity out of the ten leading industrial states. This excellent labor profile has influenced the decision of hundreds of manufacturers of all sizes to expand or build within the State.

Given all the business advantages of New York State, it is no surprise that many German firms have chosen to locate here—Siemens, Mannesmann, Ruhrkohle, August Thyssen, AGFA-Gevaert and VAW to name a few. These firms enjoy access to the largest and richest consumer market in the Western Hemisphere—within a 750-mile radius lie more than half the population and personal income of the U.S. and Canada. New York State invites more German companies to join their many compatriots who are profiting from the best business advantages in America.

NIXDORF®
COMPUTER

NIXDORF COMPUTER CORPORATION is the North American subsidiary of Nixdorf Computer AG, West Germany, a pioneer in the manufacture of easy-to-use work-station oriented computer systems. Founded in 1952 as the "Labor fuer Impulstechnik" by German scientist and businessman Heinz Nixdorf, the firm has grown in the past 29 years to become a major manufacturer of computer systems noted for their ease of use, human engineering and modularity of design.

With over 80,000 installations and reported 1980 worldwide sales revenues of $794 million, Nixdorf ranks today among the leading international computer manufacturers.

The company owes much of its success to innovation and a willingness to provide end users with a wide range of support services. Nixdorf Computer AG employs a total of over 14,000 personnel, including over 2,000 in the U.S. Nearly two-thirds of this number are engaged in service and support activities adapted to the needs of specific industries and business areas.

The largest of Nixdorf's international subsidiaries, Nixdorf Computer Corporation, is headquartered in Burlington, MA and has sales and service centers in 120 locations in the U.S. and Canada. The company has a full complement of research, manufacturing, marketing, service and administrative personnel totaling over 2,000.

Nixdorf Computer Corporation manufactures and markets a broad range of data entry, distributed processing, and word processing equipment. The expanding Nixdorf product line has achieved broad acceptance in the North American marketplace. Major users include J.C. Penney, McDonnell Douglas, U.S. Steel, Burger King, Pan American World Airways, and the Social Security Administration.

One of the outstanding aspects of business in the USA, during the year 1980, was success in again installing more data entry systems than any other manufacturer, thus consolidating the Nixdorf lead for this type of installation. The bulk of sales in the medium to small company market were achieved with the 8870 magnetic disk system. Large organizations also showed growing interest in the Nixdorf range, including the word processors which now form a focal point in the marketing operation in America.

In May 1980 Nixdorf AG moved to enter the plug compatible mainframe market by acquiring the Computer Software Company, Richmond, Virginia. That company, now called Nixdorf Computer Software Company, is one of the most successful independent suppliers of IBM and IBM-compatible operating systems and data base management software for the Systems 360, 370 and 4300, with 1000 customers in 21 countries.

Unternehmen, die OKLAHOMA als moeglichen Standort fuer neue Produktionsanlagen oder Bearbeitungsbetriebe, fuer Verwaltungsbueros, Lagerhallen oder andere Geschaeftstaetigkeiten in Betracht ziehen, steht auf bundesstaatlicher Ebene qualifizierte Unterstuetzung von seiten eines gut ausgebildeten Mitarbeiterstabs des Landesministeriums fuer Wirtschaftsentwicklung, Buero des Gouverneurs, Bundesstaat Oklahoma, zur Verfuegung.

Das Ministerium besteht aus fuenf Hauptabteilungen: Verwaltung, Industrie, Internationale Abteilung, Wasserwege und Wirtschaftsinformation. Die fuenf Direktoren der einzelnen Abteilungen

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verfuegen zusammengerechnet ueber eine Erfahrung von 91 Jahren auf dem Gebiete von Wirtschafts- und Industrieentwicklung.

In einer kuerzlich durchgefuehrten Studie unter leitenden Angestellten von wichtigen amerikanischen Unternehmen, deren Aufgabe die Standortsuche fuer neue Anlagen ist, wurde das Department of Economic Development in Oklahoma unter die drei besten bundesstaatlichen Entwicklungsbehoerden in den Vereinigten Staaten gezaehlt.

Wie der Hauptgeschaeftsfuehrer der Behoerde, Jay Casey, feststellte, hat Oklahoma eindeutig seinen Wunsch nach Investitionstaetigkeit auslaendischer Unternehmen unter Beweis gestellt. Im vergangenen Jahr klaerte der Oberste Gerichtshof des Staates eine auf diesem Gebiet aufgetretene Rechtsfrage, indem er entschied, dass die Verfassung des Bundesstaates Oklahoma Investitionen von Seiten auslaendischer Unternehmen eindeutig vorsieht.

Viele Firmen auf der ganzen Welt befassen sich daher derzeit mit der Moeglichkeit von Investitionen in Oklahoma.

Das Ministerium haelt Unterlagen mit genauen Informationen ueber mehr als 250 Staedte im ganzen Staat bereit. Die Auskuenfte erstrecken sich auf Bevoelkerung, Versorgungsbetriebe, Dienstleistungen von Seiten der Gemeinde, Ausbildungsstaetten, Transportmoeglichkeiten, Arbeitskraefte, Steuern, Finanzierung, Erholungsmoeglichkeiten, Energie- und Industriebetriebe.

Oklahomas gutes Betriebsklima und die reichlich vorhandene Energie wurden als zwei der Gruende genannt, warum Oklahoma die drittgroesste Steigerung an Arbeitsplaetzen in der Produktion von allen 50 Staaten der USA in den vergangenen zehn Jahren aufwies. Aus einer kuerzlich bundesweit durchgefuehrten Studie geht hervor, dass Oklahoma die niedrigsten pro-Kopf bundesstaatlichen und Gemeindesteuern in den ganzen USA hat.

Wenn Sie sich naeher ueber Oklahoma informieren wollen, wenden Sie sich bitte an:

Department of Economic Development
Office of the Governor
4024 North Lincoln
P.O. Box 53424, State Capitol Station
Oklahoma City, Oklahoma 73152

Peat, Marwick, Mitchell & Co.

PEAT, MARWICK, MITCHELL & CO. is a major full-service US accounting firm with 1095 partners in 99 offices throughout the country. Its diversified client list includes some of the largest US banks and US industrial companies.

Its close working relationship with Peat, Marwick, Mitchell & Co., Wirtschaftspruefungsgesellschaft, Steuerberatungsgesellschaft in Germany helps to provide professional services for German-based companies doing business in the United States and for US firms with interests in Germany.

Auditing: Peat, Marwick, Mitchell & Co. is skilled in auditing financial statements prepared in response to US or German professional requirements, and meets the needs of regulatory authorities and financial institutions in both countries.

Tax: The firm's wide range of tax services includes international tax diagnostic reviews, international tax planning, advice and assistance in complying with local, national and foreign tax laws; assistance in dealing with tax authorities and tax courts, and counselling on tax problems of individuals, expatriates and corporations.

Management Consulting: Peat, Marwick, Mitchell & Co. consulting services assist management by providing professional counsel in disciplines where internal expertise is not available. They include advice on designing and implementing management information and financial reporting systems to meet subsidiary and parent company requirements, designing electronic data processing planning, inventory control and project planning, diversification studies, market research and organization planning as well as executive search.

All professional services are performed under a global client partner concept which puts the firm's worldwide resources at the clients's disposal.

PUERTO RICO'S unique advantages have attracted over 2,000 manufacturing plants with cumulative private investments of $10.5 billion. Most are subsidiaries of mainland U.S. firms but 130 represent European, Latin American and Japanese interests.

In the last decade, high technology companies have "discovered" Puerto Rico. Today, it is one of the leading pharmaceutical production centers under the U.S. flag. Current computer, electrical/electronic and precision instrument growth rivals major industrial locations. Employment in these three segments has increased 84% to 38,000 jobs in just four years.

Industrialists earned some $3.1 billion from Puerto Rican operations in 1980. The bulk of these earnings are exempted under the Island's combination of federal, state and local municipal tax incentives, a package not available elsewhere.

Incentives for a German firm with a U.S. incorporated manufacturing subsidiary in Puerto Rico include:

- 100% tax credit on corporate income generated by this subsidiary.
- 90% exemption from Puerto Rico's maximum 45% corporate income tax rate for the first 5 years of operations of this subsidiary; thereafter, exemptions are scaled from 75% to 50% in 5-year segments.
- 100% exemption from all local municipal taxes and fees during entire exemption period of up to 25 years, depending on location of the subsidiary on the Island.

If the Puerto Rico subsidiary is U.S. incorporated, the German firm would incur an effective tax of only 14.05% on repatriated profits from the subsidiary. Non-repatriated profits could be taxed as low as 4.50%.

However, if profits from the Puerto Rico subsidiary are initially distributed to a U.S. incorporated affiliate before repatriation to the German parent firm, then the effective tax rate would be 26.94%.

All investors in Puerto Rico enjoy full protection and stability under the U.S. Constitution. Equal treatment is accorded under Puerto Rico and U.S. laws and regulations to mainland U.S., foreign or local enterprises.

Major advantages include:

- high productivity: output per dollar wages are 50% above U.S. manufacturing average.
- educated workforce: bilingual Spanish/English workers (average age 35) have 12-plus years schooling; 1 in 4 has completed or started college.
- high profitability: manufacturing profit to sales ratio averages 23%, almost 4 times that of U.S.
- integral part of $3 trillion U.S. market; no tariff on Island manufactures.
- multi-billion dollar infrastructure, modern financial/commercial services, 28 airlines (including Lufthansa) and world's 10th largest container port support manufacturing activities.

Investor inquiries welcomed at Economic Development Administration of Puerto Rico office at 6000 Frankfurt/Main 1, Zurich-Haus am Opernplatz, Federal Republic of Germany, (0611) 721242-3, or Economic Development Administration, Continental Operations Branch, 1290 Avenue of the Americas, New York, N.Y. 10104.

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Now, California Pacific National Bank offers a new alternative. The only locally owned institution whose primary purpose is to serve the international business community in California has opened an International Division at its headquarters office at the corner of Sixth Street and Grand Avenue, Downtown Los Angeles. We offer to members of the international business community the same "Private Banking"™ philosophy which benefits our domestic clientele.

For a copy of our annual report, call or write Nancy Huntington, Assistant Vice President and Corporate Secretary. If you would like to talk to an international banker about your own needs, contact:

- Robb Evans, *Chairman and Chief Executive*
- Dietmar Schmidt-Wenzel, *President*
- Richard W. Chan, *Executive Vice President*
- Cary Ching, *Vice President, International Banking Division*

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609 South Grand Avenue
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RHENUS NEW YORK is engaged in the freight brokerage business, specializing in shipping freight from the United States to overseas countries and vice versa. We also arrange the movement of exhibition goods for international trade fairs in Europe and the Far East. In addition, we handle turn-key business.

All of these activities are based on our NVOCC operation. In other words, we are a transportation coordinator securing and expediting the movement of goods from shipper's plant to the overseas customer's premises. This enables Rhenus to offer the U.S. companies involved in international business door-to-door services. Our office utilizes the network of more than 100 Rhenus branches all over the world. The majority of Rhenus New York's stock is owned by Rhenus-WTAG AG, one of the largest transportation companies in Europe, with sales of over $600 million and over 8,000 employees. Rhenus-WTAG AG is involved in all aspects of transportation.

Rhenus-WTAG AG, formed in 1912 in Frankfurt (M), operates in all areas of freight handling—on land, sea and in the air. Our organization's experience, potential and capabilities rank Rhenus among the leaders in the industry, but our success is not due to size. Rather, it is based on the harmonious cooperation of the individual companies within Rhenus-WTAG AG's worldwide organization. This guarantees the presence of the firm in all important transport centers throughout the world in cooperation with the numerous agencies of Rhenus-WTAG AG.

Customers can learn more about our services and the advantages of working with Rhenus by contacting our New York office.

Rodenstock

The RODENSTOCK GROUP, with headquarters in Munich, is one of the world leaders in ophthalmic optics. The family-owned company entered its second century of operations in 1977 under the management of Professor Dr. Rodenstock, currently the president of the Federation of German Industries (BDI).

In addition to three plants and eleven branches in Germany with over 6,000 employees, there are three German and eleven foreign subsidiaries with several manufacturing facilities.

Rodenstock products cover a wide range: Ophthalmic lenses, a comprehensive line of plastic and metal frames and sunglasses, precision optics for commercial, industrial and scientific applications including photographic, enlarging, reproduction and X-ray objectives as well as a complete line of ophthalmological refracting and diagnostic instruments and automatic processing equipment for opticians.

In the United States the Group maintains the following operations:

Rodenstock USA, Inc., Danbury, CT
Rodenstock Corporation, Yauco, PR
Rodenstock Instruments Corporation, Sunnyvale, CA
Rodenstock Precision Optics, Morton Grove, IL

Refracting and diagnostic instruments produced in Germany and the WECO instrument line are represented in the United States by Coburn Optical Industries.

Steady growth and expansion have marked Rodenstock's engagement in the United States in recent years.

THE SCHENKER STORY. The story of the Schenker enterprise is the story of an ingenious package of ideas. The grouping of goods for shipment in consolidated lots for the purpose of achieving lower freight rates, the idea of keeping under control the entire range of services necessary to be performed when offering the customer a true door-to-door movement even beyond national borders. The man who put this idea into practice was Gottfried Schenker (1842-1901). Thus, he became one of the pioneers in the history of modern transportation. On July 1, 1872 he founded, together with other investors, the enterprise Schenker & Co.

Today, on five continents in more than 100 countries and at some 350 places worldwide, the experts of Schenker are at your disposal. 17,000 specialists think, plan and work for you. More than 100 air freight centers and air terminals make Schenker one of the biggest air freight forwarders in the world. There are Schenker maritime offices in more than 100 of the most important seaports worldwide. The organization has available more than 3,000 vehicles ranging from light trucks to special tractors for heavy loads, a combined storage in excess of 5.5 million square feet and last but not least a staff of experts for the shipment of plants, animals and valuables.

In the United States, Schenker has offices in Atlanta, Baltimore, Boston, Charlotte, Charleston, Chicago, Dallas, Denver, Detroit, Houston, Jacksonville, Los Angeles, Miami, Milwaukee, Minneapolis, New Orleans, New York, Norfolk, Philadelphia, Richmond, Salt Lake City, San Francisco and St. Louis.

SMS

Together with its international affiliates, SMS SCHLOEMANN-SIEMAG AG (or for short SMS), a joint venture of the leading German machinery company Gutehoffnungshuette Aktienverein (GHH) and Siemag Weiss KG, is engaged in building machinery and plants for the steel and plastics industry.

To meet the machinery needs (continuous casting equipment, rolling mills and presses) of the steel and non-ferrous metal industries, SMS and its affiliates

- Concast AG, Switzerland (continuous casting equipment)
- SMS Schloemann-Siemag Inc., Pittsburgh, Pa. (rolling mills)
- Sutton Engineering Co., Pittsburgh, Pa. (presses and straightening machines)

market a comprehensive line of equipment, including

- complete plants
- hot rolling mills
- cold rolling mills
- shearing line equipment
- strip treatment equipment
- continuous casting equipment
- rod and tube extrusion presses as well as forging presses
- plus auxiliary equipment.

Representative of the activities of SMS in the mill equipment sector in North America are SMS Schloemann-Siemag Inc., Pittsburgh and in the press equipment sector Sutton Engineering Co., also in Pittsburgh. In the plastics processing machinery sector, business is conducted by the Battenfeld-Gloucester Group, an SMS member company. It markets plastic processing machinery components and equipment for

- injection molding
- extruding
- blow molding
- foaming

In the United States the production, distribution, engineering and service activities are performed by

- Gloucester Engineering Co., Inc., Gloucester, Mass.
- Battenfeld Corporation of America, Chicago, Ill.

In both areas (iron and steel/plastics processing), SMS and their associates are

offering a comprehensive Service Program:

- Consultations on all technical and commercial problems
- Planning to achieve technically and economically optimal solutions
- Custom-tailored designs
- Technically leading products
- Financing—also international
- Cooperation with customer countries or third countries
- Technical and commercial leadership for major projects
- Reliable deadline control and organization in all order transaction phases
- Training of customer personnel
- Service

Detailed information is available specifically from the American Member Companies to the SMS Group who are also available for personal discussions.

SCHOTT

Founded in 1968, SCHOTT OPTICAL GLASS INC., Duryea, Pennsylvania, has grown to be the United States foremost manufacturer of scientific optical glass. With the exception of its parent, Schott Glaswerke of Mainz, Federal Republic of Germany, the firm offers the world's most comprehensive variety of optical glasses.

Since the founding in 1884 of the original Jenaer Glaswerk Schott & Genossen, the Schott name has been synonymous with quality and innovation in glass. Schott Optical Glass Inc. follows in this tradition. This is exemplified by the recent completion of Schott's latest expansion—one of the world's most modern glass research and development laboratories. Schott is now even better prepared to conduct research for Western Hemisphere customers right here in the United States.

Schott Optical Glass Inc. manufactures precision glass products for many scientific applications. The industries served can be broadly separated into the ophtalmic and optical industries.

Among the opthalmic products manufactured by the firm are spectacle lens blanks made of traditional white and colored glasses, as well as photochromics, safety and special purpose glasses. The firm was awarded *Industrial Research* magazine's IR-100 Award for developing High-Lite®, a special glass which allows high prescription spectacle lenses to be made with greatly reduced thickness.

The mainstays of the precision optical product line include over 250 glass types offered in such basic forms as slabs, gobs, blocks, strips, and rods. Augmenting these raw glasses are processed products such as laser glass, radiation shielding glass, color filter glass, fiber optics, and CRT display screens.

Schott officers are Dr. Franz E. Herkt, President; Dr. Wolfgang Berthold, Executive Vice President of Operations; and John G. Gulbin, Vice President of Finance.

SCHUMAG MACHINERY, INC., located in Norwood, New Jersey, is a wholly owned subsidiary of Schumag GmbH, Aachen, West Germany.

The Aachen works, acquired and established by F.W. Schumacher 150 years ago, have provided and produced many ideas and inventions still benefiting today's highly sophisticated metals processing industry. By continuous applied research, Schumag has improved the quality and diversification capability of its machinery, maintaining at all times a position of leadership in the metals industry worldwide.

The first Schumag combined drawing machine was delivered to a German steel mill nearly half a century ago. In 1934 the first Schumag machine was exported to the U.S. They were marketed through independent distributors until the end of 1972, when the formation of a U.S. subsidiary was announced. Schumag's international business operations are channeled through two wholly owned subsidiaries in the United States and the United Kingdom, as well as 39 sales representatives throughout the world. Production lines manufactured by Schumag are in actual operation in over 50 different countries.

Schumag Machinery, Inc. at Norwood, N.J., under the leadership of its President, Mr. Max Meier, is an established concern directed to provide sales, engineering and manufacturing services to the United States and Canadian markets. The facilities occupied by the firm since 1980 amount to 16,000 square feet of plant and office space on a four-acre tract of land, envisioning imminent expansion of its business operations.

In order to provide a complete product line mix to the industries it serves, Schumag Machinery, Inc. has undertaken representation and manufacturing license agreements with George Fischer of Schaffhausen, Switzerland, Kieserling & Albrecht of Solingen and Reinking-Kolbus of Rahden, West Germany. These firms bring about a complete integration of services and equipment to the cold finishing industry by Schumag Machinery, Inc. and confirm the solid commitment made to the market during the early Seventies.

SIEMENS

SIEMENS CORPORATION is the major U.S. affiliate of Siemens AG, headquartered in Munich/Berlin.

Siemens Corporation and its affiliated companies—Siemens U.S.A.—is a broadly-based electrical/electronic engineering organization, which manufactures and markets high quality products and systems for electronic component manufacturing and testing, voice and data communications, measurement instrumentation, the major medical specialities, mining and transportation, power generation and printing.

With 1979/80 sales of nearly $600 million, 18 manufacturing plants, five research and development facilities, almost 11,000 employees and nearly 100 sales and service offices located throughout the country, Siemens and its affiliated companies are particularly well situated to provide the exceptional service and follow-through required by high technology customers.

In electronic components, Siemens and its affiliated companies can provide components for just about every application imaginable. An overview of the product categories available include capacitors, ferrites, surge voltage protectors, EMI/RFI filters, SAW filters, discrete semiconductors, integrated circuits, opto-electronic devices and a vast variety of other high technology products.

More than half the components marketed by Siemens and its affiliated companies in the U.S. are manufactured here. Locations include Somerset, New Jersey; Scottsdale, Arizona; Broomfield, Colorado; Palo Alto and Cupertino, California.

With communications, Siemens and its affiliated companies are active in all major areas, from private telephone systems (EPABX) to Teleprinters for Data, to Facsimile, Telex/TWX and Transmission Equipment. The OEM division offers a full range of computer peripheral equipment. Affiliated companies provide mobile communications equipment, multiplexers, color scanning systems for printing and railroad signalling equipment.

Manufacturing locations include Happauge, Great Neck and Melville, Long Island (N.Y.); Cherry Hill, New Jersey; and Raleigh, North Carolina.

SIEMENS-ALLIS, INC.

SIEMENS-ALLIS, INC. is a broad-line electrical supplier, manufacturing and marketing electrical equipment and systems for electric utilities and general industry. It is jointly owned by Siemens and Allis-Chalmers.

In the world of healthcare, The Siemens Medical Systems Group stands nearly alone in its ability to provide the broadest range of medical electronic equipment to the major medical specialties. Areas served include diagnostic and therapeutic radiology, nuclear medicine, patient monitoring, physiological recording, diagnostic ultrasound, cardiac and respiratory care, hearing and speech aid instrumentation, cardiac pacemakers, ventilators, operating room and dental equipment, as well as many additional electromedical applications.

Maunfacturing facilities are located in Union, New Jersey; Cheshire, Connecticut; Des Plaines, Illinois; and Walnut Creek, California.

Power Engineering provides a broad spectrum of products and systems to the basic manufacturing, process and transit industries. Products include: High Voltage Switchgear, Industrial Turbines and Turbine Generators, High Voltage Motors, Fractional Horsepower Motors, Speed Controlled Drives, Electrical Equipment for a variety of industrial uses, Water Ring Pumps, Side-Channel Compressors, Traction Systems & Controls, as well as Supervisory Systems for utility and industrial applications.

The Power Engineering Measurement Systems Division located in Cherry Hill, New Jersey provides high speed semiconductor test equipment for the electronics industry, as well as X-Ray Diffraction and Spectroscopy equipment for laboratories and industry.

Siemens Corporation shares significantly in the approximately $6 million spent each working day by its parent company Siemens AG on R & D to keep its leadership position in advanced, high-quality products and systems.

This technological support, coupled with the other resources available to it, give Siemens Corporation and its companies an in-depth ability to respond to customer and market needs in constructive ways.

Siemens Corporation is headquartered in Iselin, New Jersey.

Siemens is one of the world's largest electrical equipment manufacturers and is renowned for quality products incorporating leading edge technology resulting from a large research and development program. Allis-Chalmers is a diversified U.S. producer of heavy apparatus and equipment for industry whose electrical products have long been recognized for their durability and dependability.

Literally, Siemens-Allis represents the best of both worlds. It incorporates research and development and a solid technological base with modern production facilities and proven experience in the engineering, manufacture, sales and service of a broad line of electrical products. These include electric motors from 1-hp to 100,000-hp, switchgear, motor controls, electronic devices, DC contactors, panel boards, power switches, power regulators and power circuit breakers. All of its products are designed to meet the rigid standards of U.S. electrical utilities and industrial power users.

With 14 U.S. production facilities and over 5,000 employees, Siemens-Allis stands ready to serve both domestic and international customers with high-powered technology and a sensitivity to changing needs.

Siemens-Allis locations are as follows: Corporate Headquarters, Atlanta, Georgia; Medium Motor & Generator Division, Norwood, Ohio; Small Motor & Generator Division, Little Rock, Arkansas; Large Rotating Apparatus Division, West Allis, Wisconsin, Raleigh and Sanford, North Carolina; Power Break Division, Jackson, Mississippi; Power Regulation Division, Gadsden, Alabama; Power Switching Division, Portland, Oregon; and Circle AW Products Company in Portland, Oregon, Pomona and Modesto, California; Cetech, Inc., Lachine, Quebec, Canada; Betech, Inc., Sao Paulo, Brazil.

In addition, Siemens-Allis has its own network of nineteen service and repair centers in sixteen cities and a field service operation which covers the entire country.

HCST

HERMANN C. STARCK, INC of New York is a wholly-owned subsidiary of Hermann C. Starck, Berlin, a leading European producer of refractory and special metals.

HCST was established more than 50 years ago and has extensive production facilities in Goslar, in the foothills of the Harz mountains and in Laufenburg, Baden, near the German-Swiss border.

Tungsten, molybdenum and tantalum as metals and as compounds are HCST's principal products.

Modern production facilities for mineral dressing, chemical processing and pyrometallurgical and hydrometallurgical treatment, supported by extensive laboratories and R & D activities give HCST an unusual degree of flexibility in treating almost all types of raw materials in the special metals area.

Borcher's Co., a wholly-owned subsidiary of HCST, is Europe's leading producer of drying agents for the lacquer and paint industry and also of cobalt and nickel salts for plating and other applications.

HCST Inc. is responsible for the marketing of Starck's products in North America and also for the purchasing of some of the raw materials for Starck's operations in Europe.

In 1976 HCST substantially extended its activities in the U.S. by establishing NRC Inc., which took over the Metals Division of Norton, in Newton, Mass., together with Samincorp.

NRC is a leading producer of tantalum mill products. Participation in NRC has been a complementary addition to HCST's activities in Europe.

STINNES

STINNES CORPORATION of New York, with sales in the U.S. of more than $1 billion, is continuing its rapid growth by providing a wide range of key products and services to American industry. The company's financial resources, together with its flexibility, service orientation and international scope, have enabled it to become an important contributor to the U.S. economy, with 1,500 employees in 15 plants and numerous regional offices throughout the country.

Stinnes is a major rebuilder and reconditioner of diesel locomotives, large marine and stationary diesel engines, gear boxes and reciprocating pumping and compressing equipment such as that used in natural gas transmission. Stinnes also plays an important role in the world market for used machine tools, including the purchase of excess equipment, plant liquidations and rebuilding of machine tools.

Distribution through a network of more than 1,200 distributors is a rapidly growing service offered by Stinnes. The company acts as a manufacturer's representative

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and/or master distributor for a wide range of industrial products and supplies including special purpose vehicles, tooling components, machine tools and other metalworking equipment and mill supplies.

Stinnes' mine equipment division, which was formed in 1978 and has become an important part of the organization, presently operates plants and warehouses in the East, Midwest and Western United States. Equipment fabricated by this division includes diesel and battery-powered personnel carriers and special purpose vehicles. In addition, the division distributes and services equipment for coal and ore mining.

Stinnes' trading operations involve refined petroleum products, petrochemicals, fine chemicals, steam and metallurgical coal, minerals, ferro alloys, steel and cement. As a trading company, Stinnes acts as export/import manager, handling all aspects of international trade for producers who wish to participate in global markets without the associated complexities and risks.

Stinnes Corporation is wholly owned by Stinnes AG which, in turn, is a subsidiary of VEBA AG, the largest public company in West Germany.

Stinnes AG, with annual sales of more than $7 billion, owns or holds an interest in more than 250 companies, together employing more than 21,000 persons.

VEBA AG, with annual sales in 1980 of over $18 billion, ranks just ahead of the 10th largest U.S. industrial corporation.

JULIEN J. STUDLEY INC.

JULIEN J. STUDLEY, INC. is the largest national real estate leasing, sales, and consulting firm that deals exclusively in office space and office buildings. The firm is involved in all levels of office building activity as broker, consultant, leasing agent, and investor.

The Studley firm has over 150 professionals nationally and has represented in office space needs over 50 foreign banks, more than any other real estate firm, and more than 1,000 major corporations, law firms, and service businesses. The company maintains extensive information systems, and a full in-house information, public relations, and advertising staff.

The company has eight offices in major cities around the United States: New York City, Washington, D.C., Bethesda, Md., Houston, Boston, Chicago, Miami, and Los Angeles.

Studley serves every industry and profession as well as institutions, government agencies, and not-for-profit organizations. Services include sales and acquisitions; investment feasibility; leasing and alternatives to leasing; project development and new building planning; site assemblage; valuation; financing; and special or unusual situations by a consulting arrangement.

Julien J. Studley, Inc. works with tenants to determine the true costs of their lease commitments and assists developers and owners in making their buildings profitable. The firm evaluates real estate portfolios for investors, buyers, and sellers, and identifies and screens properties and joint partners. This is accomplished through detailed financial projections and models, market knowledge of costs and trends, and detailed understanding of the technical aspects of office building operation.

The company maintains a comprehensive statistical databank on all major tenants, office buildings, space availability, and costs and market trends throughout its market areas. Bimonthly, it publishes the *Studley Report* and *Spacedata*, statistical analyses of commercial leasing activities and rentals for cities in which Studley offices are located. The reports are considered an important economic barometer by the real estate, political, and business communities.

The Studley firm also issues numerous surveys on national and citywide real estate and economic trends, such as *The Comparative Costs of Doing Business in Six Cities* and the *New Buildings Book*.

Texas Commerce Bancshares, Inc.

TEXAS COMMERCE BANK—HOUSTON is the lead bank of the $12 billion Texas Commerce Bancshares, Inc. A multi-bank holding company, Texas Commerce Bancshares has 43 member banks in 20 Texas cities including the major port cities of Beaumont, Brownsville, Corpus Christi and Houston.

International expertise is provided through the staff at the headquarters in Houston as well as at the 8 foreign offices. These foreign offices are located in Bahrain, Caracas, Hong Kong, London, Mexico City, Nassau, Sao Paulo and Tokyo.

The International Group offers a full range of international and domestic services for companies with offices in the U.S. and abroad. International banking services include foreign exchange, letters of credit, funds transfers, Eurocurrency loans, and export-import financing. Domestic banking services including inventory financing, industrial revenue bond issues, credit information, and a range of checking and time deposit accounts are also available to provide local banking service to offices of foreign-domiciled companies located in the U.S.

For further information contact:

Jerry G. Franzen
Vice President and Manager-
European Division
International Group Texas
Texas Commerce Bank-Houston
P.O. Box 2558
Houston, Texas 77001
(713) 236-4251
Telex: 775418

Paul Poullard
Vice President and General Manager
London Branch
44 Moorgate
London, EC 2R 6 AY
638-8021
Telex: 884851

THYSSEN

THYSSEN INC., a wholly owned subsidiary and member of the West German Thyssen Group, is a holding company for Thyssen interests in U.S. and international trading and has its headquarters in New York City.

The steel products of the Thyssen mills as well as industrial products of various Thyssen enterprises have been sold in the U.S. for many years. As the demand for these products increased, it became necessary for the Thyssen Group to establish a company in the U.S. to facilitate communications, order entries, and more complete market penetration between Thyssen and its customers.

Thyssen Inc. was founded in mid-1959. Since its formation, Thyssen Inc. has continually expanded its U.S. and international operations by adding various new lines of activities to the original business of importing steel. As a result, Thyssen Inc.'s organizational set-up was restructured in the beginning of 1981 with the formation of two subsidiaries, Thyssen Steel Co. and Thyssen Carbometal Co. TRT (Thyssen Rheinstahl Technik) and Thyssen Mining Equipment continue to sell and distribute forgings, castings, and other industrial products as well as mining equipment, operating as divisions of Thyssen Inc.

Thyssen Steel Co. expanded its direct domestic sales representation with offices in

Houston and Los Angeles and with the formation of divisions and/or subsidiaries to handle and establish various additional lines of business.

In the 1970's, Thyssen Steel Co. entered the domestic market of steel warehousing with the establishment of Thyssen Metal Service/Southwest and later on with Thyssen Metal Service/Southeast, Thyssen Metal Service/West Coast and Thyssen Steel Detroit Co. These steel service centers and distributors supply the Southwest, Southeast, Northeast, the Midwest and Great Lakes areas and the West Coast respectively with rolled steel products.

At the same time, Thyssen Carbometal Co. established a worldwide business in raw materials, mainly coal and iron ore, steel scrap and secondaries, semi-finished steel as well as fertilizers and industrial chemicals.

Today, the combined operations of Thyssen Inc. employ almost 300 people in various parts of the country. The company's activities include international steel and raw material trading, warehousing and steel service center operations in the U.S., as well as sales of industrial products and mining equipment.

With such dynamic growth, Thyssen Inc. has become a major factor in the domestic steel community and in international trading.

UNION-TRANSPORT GmbH, with its headquarters in Dusseldorf, Germany, was established in 1926. It has since developed into one of the world's largest international transportation organizations, with approximately 2000 employees, providing the freight forwarding industry with over 50 years of experience and success.

In 1959, Union Air Transport GmbH, an affiliate of Union-Transport GmbH, was established in the United States, headquartered in New York. It thus became the very first foreign air freight forwarder to be established after the war in the United States. Since its beginnings, Union Air Transport GmbH, has rapidly expanded, and now operates throughout North and South America, Canada, and the United Kingdom, on-line with 13 full time branches, the newest of which opened in Denver in April '81, and several more on the drawing-board, emerging as a world leader in the industry. Union Air's success can in great measure be attributed to its General Manager, USA, Hans J. Haefner, who has worked tirelessly to promote and maintain its high standards of quality, good name, and company reputation.

Adding even further to the company's growth and success, was, in 1976, the Federal Maritime Commission's granting to Union Air a license to act as an independent ocean freight forwarder, operating out of all Union Air Transport offices in the United States.

With total sales in excess of $36 million in 1980, an increase of almost 19% over the previous year, Union Air Transport GmbH operation ranks among the highest air freight forwarders in North America.

VAW aluminum

V.A.W. of America, Inc. has been operating in Ellenville, New York since October 1965. The company, wholly owned by Vereingte Aluminium-Werke AG-Bonn, is a major producer of aluminum billet and semi-fabricated products. The V.A.W. Ellenville plant consists of an aluminum casting operation for the production of over 100 million pounds of billets in various sizes and different alloys. This constituted the basis for construction of the firm's extrusion presses and its tube drawing and rigid conduit production facilities.

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Since 1979 VAW has been operating a second plant in the United States, located in St. Augustine, Forida. This plant produces the same range of extruded and drawn aluminum products and is equipped with the most advanced electro-static paint line, enabling VAW to supply coated aluminum extrusions and tubing.

In the area of aluminum extrusions, V.A.W. operates six large presses covering the entire range of shapes from small, light-weight profiles for the building market, to heavy and complex configurations in various aluminum alloys for the construction, transportation and electrical industries. A major specialty in extrusions has been the development of close tolerance tubing and pipe, used for example in lighting standards and sail boat masts. Through years of technical development, V.A.W. expertise in these areas has led to major breakthroughs for the fabricating industry.

Another major product line is drawn aluminum tubing. The availability of advanced equipment (such as cable hydraulic draw benches), combined with technical leadership in the area of tube drawing, has enabled V.A.W. to become a major supplier of tube for consumer durable products and, in particular, outdoor lawn and garden furnishings and other specialty markets.

Over the years, V.A.W. of America has achieved a position as a leading supplier of rigid aluminum conduits for the electrical industry, and distributes aluminum conduits through a network of warehouses throughout the United States.

The V.A.W. operations are backed by a complete R & D and testing laboratory. The laboratory utilizes diverse testing equipment, including ultra-modern electro-spectographic analyzing machinery.

V.A.W. plans to apply its knowledge and expertise acquired through the years to ensure its continued position as a major supplier of extrusions and tubing to the growing aluminum market in the United States.

VDM DIVISION

The VEREINIGTE DEUTSCHE METALLWERKE AG forms part of the Corporate Division Manufacturing of Metallgesellschaft AG, Frankfurt.

In 1980/81 sales of the VDM Group totalled DM 1.4 billion, of which 40% represented exports. VDM sales offices in many European, North and Latin American countries as well as in Australia and Japan play an increasingly important role.

VDM manufactures products out of high-value metals and alloys as well as packaging for many purposes. The automotive and electrical industries as well as builders of machinery and plants in Germany and abroad are the principal customers.

VDM Technologies Corp., New York, with offices in Chicago, Houston and Los Angeles, was founded in 1980. VDM's 50th year with the aim to strengthen the company's position in the important North American market, to intensify its customer relations and to expand its technological cooperation. Vereinigte Deutsche Metallwerke Canada Ltd. has been established in Toronto and Calgary for a number of years.

For the American market VDM supplies products (pipes, sheets, strips, wire, etc.) out of nickel and materials with nickel content, titanium, zirconium and special high-grade steels to conform to any international standard, such as ASTM, ASME, BS, DIN, etc. for chemical plants, offshore installations, power plants, automotive industry and ships.

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VILLEROY & BOCH

There are two marketing arms of VILLEROY & BOCH in America. Villeroy & Boch Tableware Ltd. markets dinnerware, crystal, giftware, and collectibles. Villeroy & Boch USA Inc. markets ceramic wall/floor tiles and kitchen/sanitary fixtures.

VILLEROY & BOCH USA INC., Pine Brook, New Jersey. Founded in 1975, and under the direction of Alfred A. Pangels, President, and Executive Vice President Kurt Scholler, the 1978 move to the current General Headquarters effected a 400% increase in warehouse capacity for the rapidly expanding operation.

A New York showroom was quickly followed in 1980 with a full-operations West Coast facility in Anaheim, California, incorporating showrooms, sales offices and warehousing to serve the Pacific, Rocky Mountain and Midwest territories. The distribution network is coast-to-coast, touching every state through approximately 250 distributors. The marketing efforts of V&B distributors and Pine Brook are primarily directed to architects and interior designers with the accent on the kind of design that led the parent company to the very forefront of quality tile and fixture creation in Europe, and the world.

VILLEROY & BOCH TABLEWARE LTD., 41 Madison Avenue, New York, New York.

Originally founded as Ceramar Incorporated in 1969, the operation was converted into a wholly owned V&B subsidiary in 1976 under the direction of Carlo H. Piccoli. V&B Tableware Ltd. is charged with the marketing of all V&B branded dinnerware, giftware and collectibles, as well as Heinrich porcelain dinnerware, and a growing fine crystal capability most recently augmented by the parent company's acquisition of Josephinehutte glassworks. V&B products can be seen in showrooms in Boston, Minneapolis, San Francisco, Los Angeles, Dallas, Atlanta, and the organization's 41 Madison Avenue location in New York. In all, 10 sales organizations market V&B products in America, with a field force of 51. 1981 has seen V&B move out aggressively into consumer advertising media with major schedules in *House & Garden, House Beautiful, Bride's Magazine, Modern Bride, Gourmet* and *The New Yorker*. The thrust of V&B's consumer and trade communications is perhaps best expressed in the campaign theme, "More than a little continental—the look most found in the fashionable households of France, Belgium and Germany."

The parent company, VILLEROY & BOCH, is over 230 years old and is one of the oldest privately-owned companies in Europe, with 16,000 employees in 18 factories located in Germany, France, Italy and Luxembourg. It is headed by L.G. von Boch, representing the eighth generation of the Boch family to serve as chief executive officer.

VOLKSWAGEN OF AMERICA, INC. was formed in October 1955 as a wholly-owned subsidiary of Volkswagenwerk AG, Wolfsburg, West Germany. Originally established as the official importer of Volkswagens to the United States, VWoA has also served as the official importer of Porsche sports cars and Audi models since the establishment of its Porsche Audi Division in 1969.

VWoA corporate headquarters is located in Warren, Michigan. Marketing of cars imported and manufactured by VWoA is through offices in Englewood Cliffs, New Jersey, and distributing companies which serve two separate dealer networks—one authorized to sell and service VWs and the

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Manufacturing divisions within VWoA include an assembly plant in Westmoreland County, Pennsylvania, a sheet metal stamping plant in South Charleston, West Virginia and an air conditioning and automotive component plant in Fort Worth, Texas. VWoA has another production facility in Sterling Heights, Michigan, which is scheduled to begin operation in the summer of 1982.

Volkswagen of America also established separate financial subsidiary companies in 1981 to provide automotive financing support for its VW and Porsche Audi dealers. The subsidiaries are VW Financial Corporation, which provides required financial funding, and VW Credit, Inc., which, in agreement with Chrysler Financial Corporation, implements a program of dealer wholesale financing as well as customer retail and lease financing.

Under the direction of James W. McLernon, President and Chief Executive Officer, VWoA is also responsible for developing national sales programs, preparing and distributing technical and sales literature, developing and supervising training programs for service mechanics, maintaining inventory control over replacement parts, producing and placing national advertisement, administering insurance programs and conducting many other activities to ensure the continued success of Volkswagen, Porsche and Audi in the U.S. market.

WACKER

Founded in 1914 by Dr. Alexander Wacker, WACKER-CHEMIE GmbH, Munich, with sales of DM 1.9 billion, ranks today among the 100 largest industrial companies in the Federal Republic of Germany.

Operations began with the first synthetic production of acetaldehyde, acetic acid and acetone on an industrial scale. Pursuing its production and market opportunities, the company expanded its business during the past decades with the addition of plants and subsidiaries in Germany and abroad. Partners throughout the world were licensed. We invented polyvinyl alcohol, the polymerisation of polyvinyl chloride in suspension, and the production of acetaldehyde through direct oxidation of ethylene.

Today Wacker-Chemie is one of the leading enterprises in the German chemical industy. The commodity plastics, polyvinyl chloride and polyethylene, produced in large plants in the Burghausen and Cologne works in Germany, form the basis for its large scale operations. With the development of special grades, the company succeeded in securing sales at a high volume that is the prerequisite for efficient production.

Polyvinyl acetate, used for many different applications, is one of the important product groups. Copolymers and terpolymers containing ethylene are pioneering new applications in this sector.

Chlorinated solvents are part of the traditional business of Wacker-Chemie. They are used in many variations for surface treatment.

In 1948, Wacker-Chemie began to produce silicone and silanes. They are offered today in a wide variety of types and represent one of the principal pillars of the sales program. It is supplemented by highly dispersed silicic acid and by silicon carbide.

Our subsidiary Wacker-Chemitronic Gesellschaft fuer Elektronik-Grundstoffe GmbH is one of the world's leading producers of pure silicon. In the product's largest market, the United States, it is produced in the Portland, Oregon plant of Wacker Siltronic Corporation.

Wacker-Chemie pays particular attention to the development of new product applications in keeping with the needs and wishes of the processing industries.

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Ward Howell International

The 1982 business year promises to be very positive for those executive search firms who have substantial multinational clients and billings. Most European firms are still expanding their US operations and have not had a chance to train adequate numbers of senior and middle-management executives.

WARD HOWELL INTERNATIONAL has opened an additional office in Minneapolis, Minnesota—thus giving the firm six offices, and with the addition of Mexico City, eight foreign locations. A new office is planned for Texas during late 1981 or early 1982. The professional staff—world wide—exceeds 45 people and the support staff in research, clerical, and administrative is about 100.

The central computer gains constantly in significance as it now stores close to 20,000 personal profiles and can be accessed by name, profession, employer, education, industry and geographic location. Eventually, every consultant will have access to the terminal from anywhere in the world.

We look forward to the coming business year as it promises to be an active one, especially in the fields of marketing and finance. We are also getting more and more assignments from small ($10 to $25 million) businesses, both foreign and domestic, who are turning to search firms to fill their needs for professional management.

WestLB

WESTDEUTSCHE LANDESBANK ranks among the largest banks in the world with a total group business volume of more than DM 152 billion. It was formed in 1969 as a result of a merger of the Rheinische Girozentrale and Provinzialbank, an institute based in Duesseldorf with more than a century of banking experience, with the Landesbank fuer Westfalen Girozentrale, founded in Muenster in 1832.

WestLB is incorporated under public law. Its owners and guarantors, each with a one-third shareholding, are the State of North Rhine-Westphalia, the regional authorities of the Rhineland and of Westphalia-Lippe, and the associations of the regional Sparkassen in those two areas. WestLB is both clearing and partner bank to the 166 Sparkassen of North Rhine-Westphalia, whose assets total DM 147 billion. It acts also as a state and municipal bank. By virtue of its large portfolio of fixed interest mortgages and the savings contracts of its Building and Loan Association (LBS) WestLB is one of Germany's most significant construction financing banks.

As a universal bank with an emphasis on long-term financing, WestLB is able to provide its private, commercial and public sector clients both in Germany and in foreign countries with a comprehensive range of financings and investment services. In addition to export and import financings, WestLB's range of services for its internationally active clients includes international loan and bond financings in D-mark and Euro-currencies, as well as financings in local currencies through its branches and affiliates abroad. This network also enables WestLB to meet clients' needs for cover in all currencies and to handle their international payment transactions. On the basis of its cooperation agreement with the Sparkassen, WestLB increasingly handles the foreign business of Sparkassen clients.

As a major force in the domestic and foreign capital markets, WestLB is in a position to offer investment opportunities in a broad variety of bond issues—in either D-mark or foreign currencies—as well as in shares and mutual funds. The Bank's range of services for investors also includes portfolio management and the launching of special investment funds.

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DGZ
Large-scale finance for a growing clientele.

Among Germany's internationally active banks, DGZ, Deutsche Girozentrale – Deutsche Kommunalbank –, ranks high on the list.

With a balance sheet total of more than DM 22 billion, unencumbered by the heavy day-to-day demands of a retail branch network, DGZ is ideally equipped for wholesale lending on an international scale.

The Bank's growing corporate and public sector clientele has come to appreciate the financial knowhow and flexibility of DGZ's compact management team. Main financing emphasis is on DM fixed-interest loans, export financing and credits in various currencies.

The Bank's wholly-owned Luxembourg subsidiary, Deutsche Girozentrale International S.A., has built a solid reputation as an active Euromarket partner for money market operations on a global basis, foreign exchange transactions and in the Eurocredit sector.

As a major issuing house in the domestic market, the Bank is also a respected partner for international loan syndication and Eurobond issues.

DGZ is a "banker's bank" within the German Savings Banks Organization in which it is the sole member institute on the federal level.

This position combined with expert liquidity management enables the Bank to play a substantial part in large-scale international financing, wherever it is required.

Deutsche Girozentrale
· Deutsche Kommunalbank ·

FRANKFURT · BERLIN

Taunusanlage 10, 6000 Frankfurt am Main 1
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Tel.: 2 69 31, Telex: 04 14 168

the "small" team with big resources

WestLB New York offers a broad spectrum of flexible banking services tailored to the needs of the multi-national firms already doing business in the United States. As WestLB has the capability to package its financing to suit U.S. market requirements, credit in the U.S. can be quickly arranged.

The Bank's presence abroad and its participation in internationally operating financial institutions make WestLB a strong partner for all engaged in international business.

OTTO WOLFF, headed by the Cologne-based OTTO WOLFF AG, is an international enterprise. The Group operates in a wide field of trade and production, with steel processing and machine and industrial plant installations representing the company's strongest sector.

One prime center of activity is the production and distribution of tinplate, cold rolled sheet and electric sheet. Incorporating all the latest functional technology, these materials meet the diverse demands of the packaging, automotive and electrical industries.

Rolling mill products such as profile steel, reinforcing bars and other construction elements, wire mesh, screws, but plastics goods as well, round out the program and show the emphasis laid on supplies in the fields of infrastructure. Another significant part of the Group's activities involves construction of highly specialized and complex technical apparatus. Whether in precision machines or measuring instruments, drilling rigs, earth-movers or material handling systems, heavy machinery or complex industrial equipment, Otto Wolff's predominance in achievement and technology is beyond question.

With a constant eye on the market, ready to adapt Group structure to change, with first rate service and distribution performance and with strong financial power, Otto Wolff is a reliable and trustworthy partner.

International marketing, based on a range of the Group's own overseas subsidiaries and agencies, guarantees rapid adaptation to current market trends.

The United States market has been acquiring growing importance in Otto Wolff's international operations as the continuous expansion of the US-network shows. Today the Group is represented by the Otto Wolff US Holding Corp., Chicago, affiliated to which the Otto Wolff America Inc., Chicago, San Francisco and Houston/Texas covers key regional areas.

With Hurricane Industries Inc., Houston/Texas, the first production unit in the States joined the Group last year. Their diversified program in steel bars, drawn wire, wire rods and mesh, and their strong sales organization, are expected to give major impulses to Otto Wolff US business activities.

CARL ZEISS, INC. is part of the worldwide ZEISS organization headquartered in West Germany. Since its establishment as the U.S. subsidiary of its German parent 55 years ago, Carl Zeiss, Inc. has constantly expanded its presence in the American market as a sales, marketing and service organization of precision optical products for the scientific community, for industry and the consumer—products which have consistently set world standards for quality for nearly 150 years. Zeiss technology has always been synonymous with "state of the art," and uncompromising excellence has been applied to such diverse areas as light and electron microscopes, ophthalmic diagnostic instruments, geodetic and photogrammetric instruments, precision machines for industrial measuring, lenses for industrial uses and aerial cameras, telescopes, and planetaria—to name a select few. With offices in principal metropolitan areas throughout the country, the Carl Zeiss, Inc. organization has grown to more than 300 employees nationwide. In addition to the traditional Zeiss offering of scientific, medical, and industrial products, there is a line of binoculars, riflescopes, sunglasses and sporting glasses. The most recent addition to the consumer products line are high fashion eyeglass frames and sunglasses available through professional ophthalmic dispensers.

Along with excellence, pioneering has been another keynote in the history of Zeiss. One area in which this innovative spirit has been applied and in which Zeiss takes particular pride is the field of microsurgery. The surgical precision attainable through Zeiss-developed microsurgical equipment has paved the way for monumental surgical breakthroughs. That which was previously impossible is now, although no less impressive, an everyday occurrence: the reattachment of severed limbs, reversal of vasectomies and tubal ligations, enhanced precision in neurosurgery, brain surgery, and reconstructive surgery, new possibilities in vascular surgery to prevent strokes, in the battle against diabetic blindness and in many other fields. The list goes on and will continue to grow and attest to one in a long series of Zeiss achievements which have improved the quality of life.

MILWAUKEE

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Fred Luber is Chief Executive Officer of Super Steel Products Corporation, a steel fabricator.

He began in 1966 with $100,000 is sales. Today Super Steel has $34 million in sales, almost 400 employees and an annual compounded growth of 45 percent.

Milwaukee helped Super Steel grow. In 1972 Milwaukee sold Super Steel 30 acres in one of its industrial land banks, and provided revenue bonding for a new plant. In fact, revenue bonding was used seven times for company growth.

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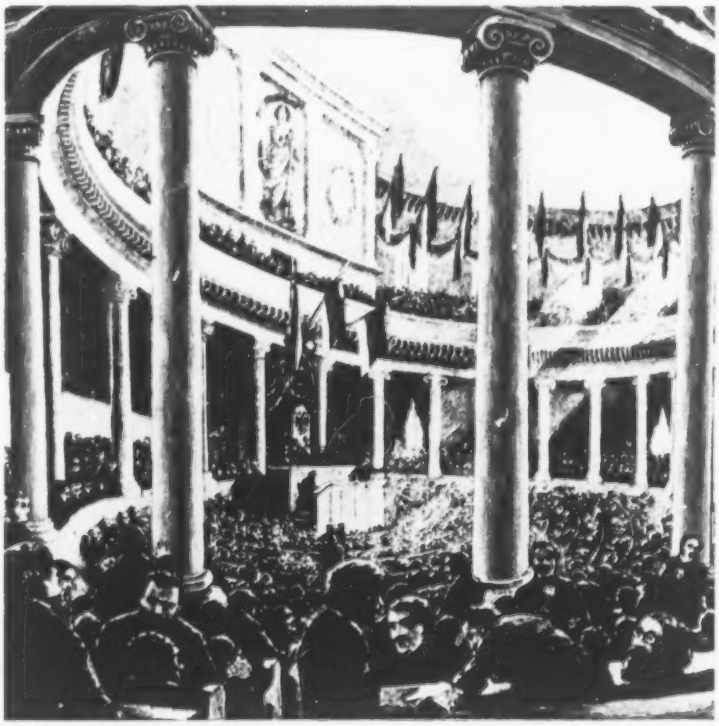

National Assembly at Frankfurt Paulskirche (19th Century)

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BHF-BANK serves nine out of ten top German concerns and its international corporate banking experts advise multinational companies around the world. It is active in most decisive financial centers, with own offices or subsidiaries in New York, London, Zurich, Luxembourg and the Cayman Islands as well as service points in many other strategic locations around the globe.

Although today's available financial instruments are more sophisticated, the basic values of BHF-BANK remain constant: integrity, loyalty and personal responsibility with a flair for financial creativity.

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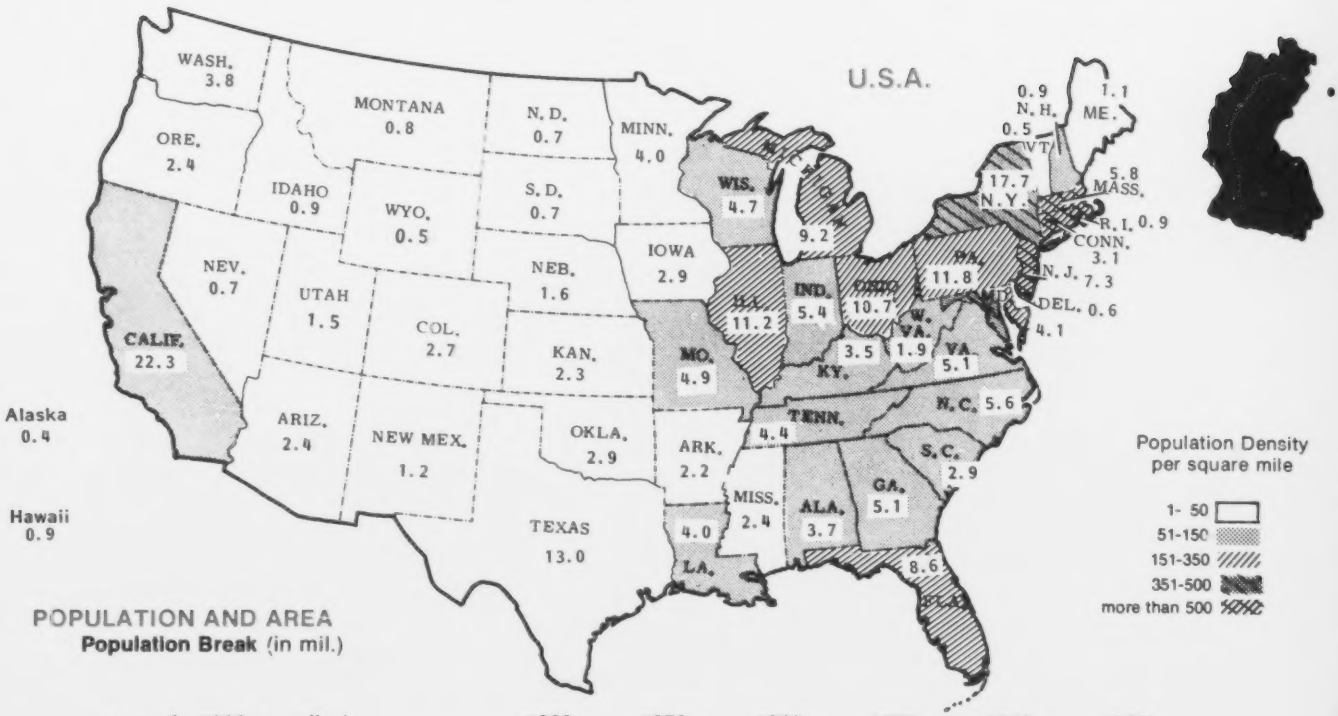
Prepared by
Dr. K. Kral
Manager, Economics & Statistics
German American
Chamber of Commerce



POPULATION AND AREA

Population Break (in mil.)

Area (in 1000 sq. miles)	1960	1970	1975	1978	1979	1980 3,618.5
Population (in mil.)	180.7	204.9	213.5	218.6	220.6	226.5*
—male	89.3	100.3	104.2	106.5	107.5	110.0
—female	91.4	104.6	109.3	112.1	113.1	116.5
By age (in %)						
—under 18	35.4	34.2	30.9	29.0	28.4	28.2
—between 18-65	55.2	56.0	58.8	60.0	60.4	60.5
—over 65	9.4	9.8	10.3	11.0	11.2	11.3
Households (in mil.)	58.2	63.4	71.1	76.0	77.3	79.1

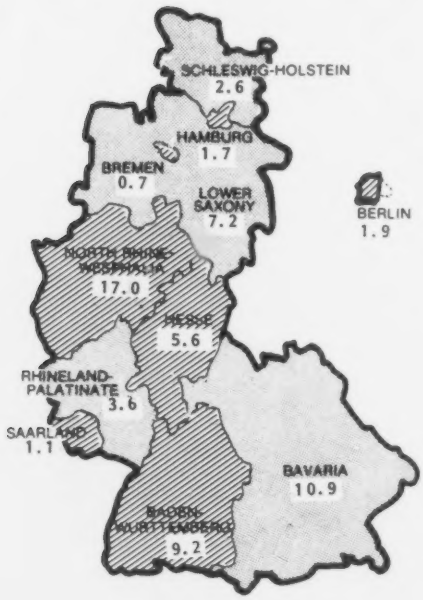
Source: U.S. Department of Commerce **Based on new benchmark levels. Not comparable with previously published data.*

Labor Market (in 1000)

Period	Civilian Labor Force	Employment Total	Manufacturing	Agric.	Gov.	Other	Unemployment Unemployed	%
1960	69,628	65,778	16,696	5,458	8,358	35,266	3,852	5.5
1970	82,715	78,627	19,349	3,462	12,561	43,255	4,088	4.9
1971	84,113	79,120	18,572	3,387	12,887	44,274	4,998	5.9
1972	86,542	81,702	19,090	3,472	13,340	45,800	4,840	5.6
1973	88,714	84,409	20,054	3,452	13,742	47,161	4,304	4.9
1974	91,011	85,936	20,016	3,492	14,285	48,143	5,076	5.6
1975	92,613	84,783	18,347	3,380	14,720	48,336	7,830	8.5
1976	94,773	87,485	18,997	3,297	14,971	50,220	7,288	7.7
1977	97,401	90,546	19,647	3,244	15,079	52,576	6,855	7.0
1978	100,420	94,373	20,332	3,342	15,476	55,223	6,047	6.0
1979	102,908	96,945	21,062	3,297	15,920	56,666	5,963	5.8
1980	104,719	97,270	20,304	3,310	16,248	57,408	7,448	7.1
1981, June	106,176	98,392	20,405	3,265	16,017	58,705	7,784	7.3

Source: U.S. Department of Labor
Council of Economic Advisors

GERMANY



POPULATION AND AREA

Population Break (in mil.)

Population Density per square mile

351-500

more than 500

Area (in 1000 sq. miles)	1960	1970	1975	1978	1979	1980
						96.0
Population (in mil.)	55.4	60.7	61.8	61.3	61.4	61.7
—male	26.0	28.9	29.4	29.2	29.3	29.5
—female	29.4	31.8	32.3	32.1	32.1	32.2
By age (in %)						
—under 18	25.3	27.1	25.8	24.3	23.6	-
—between 18-65	63.8	59.7	59.6	60.3	60.7	-
—over 65	10.9	13.2	14.6	15.4	15.7	-
Households (in mil.)	19.3	22.0	23.7	24.2	24.5	24.8

Source: Statistisches Bundesamt, Germany

Labor Market (in 1000)

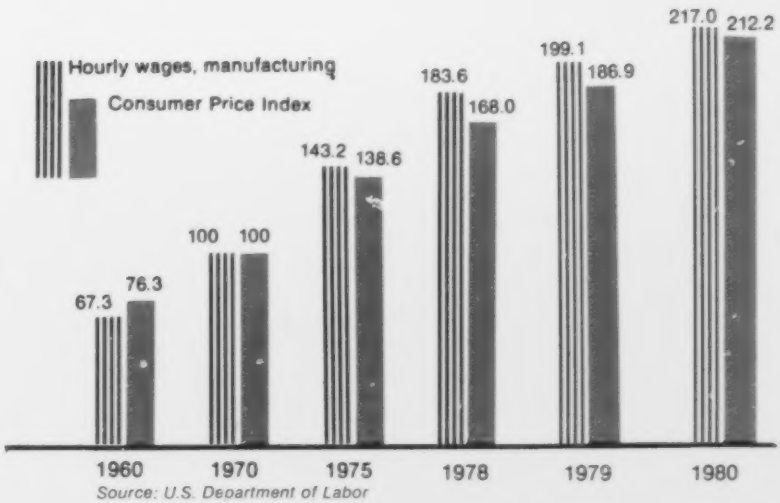
Period	Civilian Labor Force	Employment					Unemployment	
		Total	Manu-facturing	Agric.	Gov.	Other	Unemployed	%
1960	26,518	26,247	12,518	3,623	2,434	7,672	271	1.3
1970	26,817	26,668	13,024	2,262	3,077	8,305	149	0.7
1971	26,910	26,725	12,989	2,144	3,198	8,394	185	0.9
1972	26,901	26,655	12,815	2,038	3,296	8,506	246	1.1
1973	26,985	26,712	12,830	1,954	3,376	8,552	273	1.3
1974	26,797	26,215	12,398	1,882	3,421	8,514	582	2.6
1975	26,397	25,323	11,615	1,823	3,509	8,376	1,074	4.7
1976	26,136	25,088	11,379	1,743	3,505	8,461	1,060	4.6
1977	26,074	25,044	11,330	1,656	3,477	8,581	1,030	4.5
1978	26,223	25,230	11,359	1,608	3,514	8,749	993	4.3
1979	26,449	25,573	11,482	1,558	3,584	8,949	876	3.8
1980	26,684	25,795	11,588	1,518	3,613	9,076	889	3.8
1981, June	-	-	-	-	-	-	1,126	4.8

Source: Statistisches Bundesamt, Germany

U.S.A.

WAGES AND PRICES

Wages and inflation (1970=100)



Source: U.S. Department of Labor

Gross Hourly Earnings (in $)

Period	Manu-facturing	% chg. from year earlier	Primary Metal Indus.	Chem.	Mech. engin.	El. engin.	Transp. equip.	Apparel
1960	2.26	+3.2	2.81	2.50	2.55	2.28	2.74	1.59
1970	3.35	+5.1	3.93	3.69	3.77	3.28	4.05	2.39
1975	4.83	+9.3	6.17	5.37	5.36	4.58	6.02	3.19
1976	5.22	+8.1	6.80	5.89	5.76	4.91	6.54	3.41
1977	5.68	+8.8	7.40	6.43	6.25	5.39	7.28	3.62
1978	6.17	+8.6	8.20	7.01	6.77	5.82	7.91	3.94
1979	6.70	+8.6	8.97	7.60	7.32	6.32	8.54	4.23
1980	7.27	+8.5	9.77	8.30	8.00	6.95	9.32	4.57
1981, June	7.98	+10.5	10.81	9.05	8.81	7.56	10.33	4.99

Source: U.S. Department of Labor

Consumer Price Index (1967=100)

Period	All items	% chg.from year earlier	Housing (Rent)	Food	Util.	Apparel	Transp.	Health care	Enter-tainment
1960	88.7	+ 1.6	91.7	88.0	95.9	89.6	89.6	79.1	-
1970	116.3	+ 5.9	110.1	114.9	107.6	116.1	112.7	120.6	116.7
1975	161.2	+ 9.1	137.3	175.4	167.8	142.3	150.6	168.6	152.2
1976	170.5	+ 5.8	144.7	180.8	182.7	147.6	165.5	184.7	159.8
1977	181.5	+ 6.5	153.5	192.2	202.2	154.2	177.2	202.4	167.7
1978	195.4	+ 7.7	164.0	211.4	216.0	159.6	185.5	219.4	176.2
1979	217.4	+11.3	176.0	234.5	239.3	166.6	212.0	239.7	187.6
1980	246.8	+13.5	191.6	254.6	278.6	178.4	249.7	265.9	205.3
1981, June	271.3	+ 9.6	206.8	264.5	320.2	185.8	277.2	292.1	220.4

Source: U.S. Department of Labor

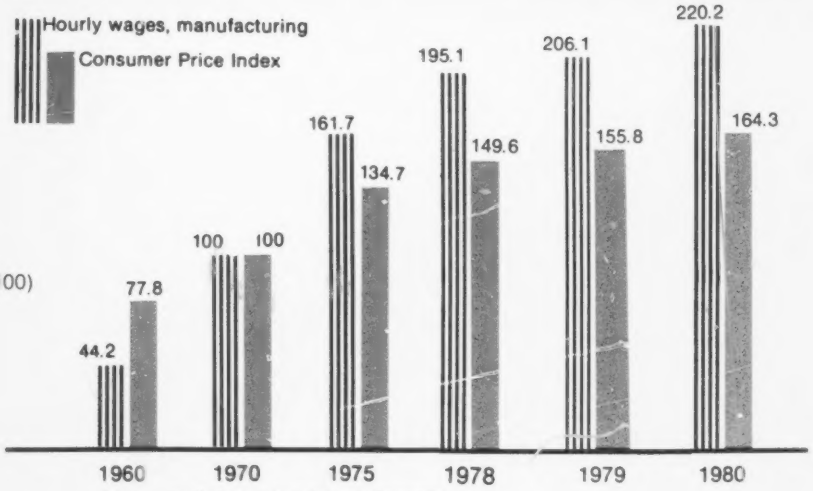
Producer Price Index (1967=100)

Period	All commod.	% chg. from year earlier	Farm products	All ind. commods.	Iron & steel	Chems.	Machs. nonel.	Processed foods
1960	94.9	+ 0.1	97.2	95.3	97.1	101.8	-	89.5
1970	110.4	+ 3.7	111.0	110.0	115.1	102.2	-	112.0
1975	174.9	+ 9.2	186.7	171.5	200.9	181.3	173.3	182.6
1976	183.0	+ 4.6	191.1	182.4	215.8	187.0	185.0	178.0
1977	194.2	+ 6.1	192.5	195.1	230.3	192.7	197.7	186.1
1978	209.3	+ 7.8	212.5	209.4	253.6	198.8	214.3	202.6
1979	235.6	+12.6	241.4	236.5	283.5	222.3	234.2	222.5
1980	268.8	+13.8	249.4	274.5	305.2	260.3	263.0	241.2
1981, June	294.5	+10.9	260.3	304.7	329.9	290.3	287.0	249.7

Source: U.S. Department of Labor

GERMANY

WAGES AND PRICES



Source: Statistisches Bundesamt, Germany

Gross Hourly Earnings (in DM)

Period	Manu-facturing	% chg. from year earlier	Iron & Steel	Chem.	Mech. engin.	El. engin.	Road Motor Vehicles	Apparel
1960	2.69	+10.2	3.30	2.70	2.78	2.42	3.02	1.94
1970	6.09	+13.4	6.83	6.51	6.32	5.48	6.84	4.54
1975	9.85	+ 7.9	10.47	10.51	10.39	9.06	11.28	7.38
1976	10.49	+ 6.5	11.14	11.32	10.98	9.61	12.02	7.83
1977	11.27	+ 7.4	11.92	12.21	11.83	10.38	12.96	8.40
1978	11.88	+ 5.4	12.47	12.85	12.38	10.89	13.65	8.88
1979	12.55	+ 5.6	13.23	13.42	13.07	11.50	14.29	9.28
1980	13.41	+ 6.9	14.00	14.13	13.97	12.33	15.28	9.86
1981, April	13.98	+ 5.1	-	-	-	-	-	-

Source: Statistisches Bundesamt, Germany

Consumer Price Index (1976=100)

Period	All items	% chg.from year earlier	Housing (Rent)	Food	Util.	Apparel	Transp.	Health care	Enter-tainment
1960	55.2	+1.4	38.9	59.3	42.3	58.3	54.2	45.0	52.6
1970	71.2	+3.3	71.4	73.1	56.7	71.0	66.6	67.5	73.6
1975	95.9	+6.0	95.1	95.1	93.8	96.7	95.5	95.4	96.3
1976	100	+4.3	100	100	100	100	100	100	100
1977	103.7	+3.7	103.4	104.9	100.9	104.8	102.1	103.9	101.7
1978	106.5	+2.7	106.4	106.4	103.3	109.4	105.1	108.0	103.4
1979	110.9	+4.1	109.8	108.2	124.8	114.2	110.0	112.6	106.1
1980	117.0	+5.5	115.4	112.7	137.6	120.8	116.8	119.1	108.9
1981, June	123.9	+5.5	120.2	118.8	152.9	126.5	125.8	125.7	112.7

Source: Statistisches Bundesamt, Germany

Producer Price Index 6 = 100)

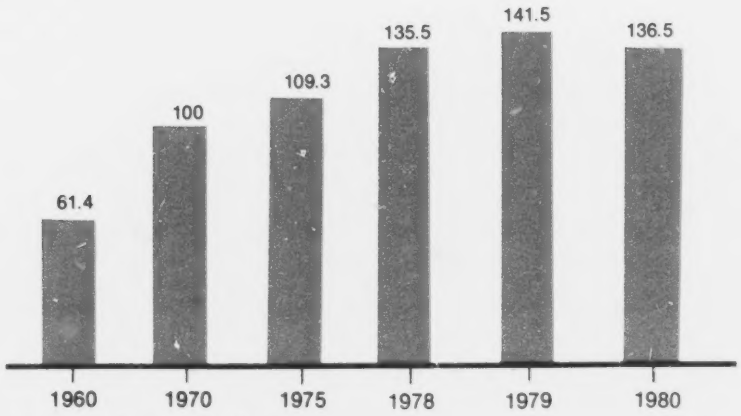
Period	All commod.*	% chg. from yr. earlier	Farm products	All ind. commods.	Iron & steel	Chems.	Machs. nonel.	Processed foods
1960	64.8	-	60.5	62.3	73.4	70.5	50.2	69.8
1970	69.3	+5.6	67.1	71.0	72.0	74.9	66.4	75.4
1975	94.5	+3.4	89.4	96.4	99.0	98.8	95.1	96.1
1976	100	+5.8	100	100	100	100	100	100
1977	101.8	+1.8	98.9	102.7	96.0	99.1	105.0	105.7
1978	101.0	-0.3	95.5	103.9	96.1	97.4	108.7	104.8
1979	108.0	+6.9	96.9	108.9	99.0	105.5	112.8	105.0
1980	116.5	+7.9	99.3	117.1	102.9	113.8	118.8	107.7
1981, June	125.1	6.6	101.6	125.8	105.4	123.6	125.1	113.1

**Wholesale price index*

Source: Statistisches Bundesamt, Germany

INDUSTRIAL PRODUCTION

Index of Industrial Production (1970=100)



Source: U.S. Department of Commerce

Value of Shipments by Industry (in mil. $)

Period	All industries	Iron & steel	Nonferr. metals	Machs. nonel.	Machs. elec.	Motor-vehicles	Chemicals	Textiles
1960	364,920	16,080	9,720	33,240	23,400	25,920	27,720	14,520
1970	630,715	25,032	21,423	55,859	48,137	42,537	49,253	22,338
1971	666,959	26,656	21,312	58,830	50,041	54,786	52,170	24,472
1972	744,198	28,109	21,392	61,024	55,950	66,762	57,437	26,726
1973	856,778	35,260	26,539	73,380	63,497	77,278	67,034	30,531
1974	981,985	47,424	33,248	86,572	66,741	72,120	81,377	33,097
1975	992,687	40,353	24,156	89,485	64,388	73,220	85,967	32,941
1976	1,185,716	46,687	30,531	105,529	73,868	95,380	104,142	36,387
1977	1,335,072	51,519	40,877	119,008	85,759	117,758	113,891	40,821
1978	1,496,573	60,533	47,455	137,119	98,661	132,207	126,445	43,951
1979	1,692,001	68,663	54,650	157,695	110,713	129,364	149,481	46,992
1980	1,798,539	64,447	-	169,318	123,390	106,030	162,390	48,780

Source: U.S. Department of Commerce

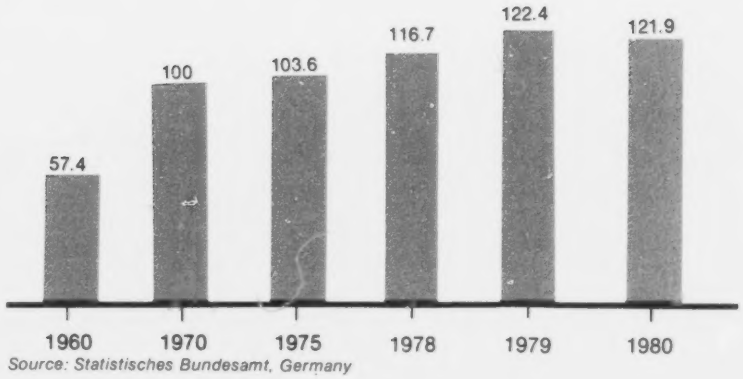
Production of Selected Commodities

Period	Coal	Steel	Alum.	Cement	Sulfuric acid	Plastics	Elec. energy (in bil. kWh)	Cars (in 1000 units
	(in mil. short tons)							
1960	435	99.3	2.344	62.8	17.9	3.1	841.6	6,675
1970	613	131.5	4.757	76.1	29.5	9.4	1,639.8	6,547
1971	561	120.4	4.739	80.3	29.0	10.5	1,717.5	8,585
1972	602	133.2	5.067	84.6	31.4	12.9	1,853.4	8,824
1973	599	150.8	5.567	87.5	31.5	15.1	1,947.1	9,658
1974	610	145.7	6.093	82.9	34.2	15.2	1,967.6	7,331
1975	654	116.6	5.035	69.7	32.4	12.4	2,001.0	6,713
1976	685	127.9	5.597	74.5	33.5	14.8	2,036.5	8,498
1977	698	125.3	6.130	78.7	35.8	17.3	2,124.1	9,201
1978	671	137.0	6.211	84.8	41.1	19.4	2,203.9	9,165
1979	781	136.0	6.499	84.9	43.1	21.0	2,247.2	8,419
1980	835	111.1	6.501	77.0	43.9	19.3	2,285.4	6,400

Source: U.S. Department of Commerce

INDUSTRIAL PRODUCTION

Index of Industrial Production (1970=100)



Source: Statistisches Bundesamt, Germany

Value of Shipments by Industry (in mil. DM)

Period	All industries	Iron & steel	Nonferr. metals	Machs. nonel.	Machs. elec.	Motor-vehicles	Chemicals	Textiles
1960	266,373	20,107	4,564	24,475	19,353	16,577	22,360	16,482
1970	528,867	30,563	9,515	56,398	50,873	42,013	50,527	24,350
1971	563,033	27,506	8,736	61,092	54,578	46,161	53,576	26,054
1972	596,014	28,179	9,194	62,968	60,299	48,037	56,738	26,476
1973	743,232	38,195	13,738	75,175	72,799	69,185	75,042	28,789
1974	836,052	50,438	16,513	83,030	79,584	67,705	100,169	29,986
1975	819,312	42,842	13,766	92,562	78,318	77,533	90,451	28,159
1976	916,950	43,493	16,084	96,155	85,716	94,902	104,084	30,754
1977	963,132	40,056	16,238	101,514	92,101	105,738	108,539	31,268
1978	999,924	40,433	16,614	105,262	96,716	114,817	110,611	31,043
1979	1,105,356	45,670	21,284	111,389	104,054	124,634	126,007	32,315
1980	1,196,544	47,450	25,333	122,782	112,762	126,924	126,478	33,025

Source: Statistisches Bundesamt, Germany

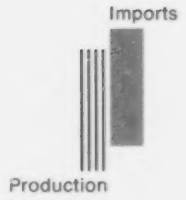
Production of Selected Commodities

Period	Coal	Steel	Alum.	Cement	Sulfuric acid	Plastics	Elec. energy (in bil. kWh)	Cars (in 1000 units)
	(in mil. metric tons)							
1960	142.3	33.4	0.169	24.9	2.6	1.0	116.4	1,817
1970	111.3	44.3	0.309	38.3	3.6	4.4	242.8	3,529
1971	110.8	39.7	0.428	41.0	3.6	4.8	259.6	3,692
1972	102.5	43.2	0.445	43.1	3.9	5.5	274.8	3,513
1973	97.3	48.9	0.533	41.0	4.1	6.5	299.0	3,643
1974	94.9	52.6	0.689	36.0	4.2	6.3	311.7	2,840
1975	92.4	39.7	0.678	33.5	3.4	5.1	301.8	2,906
1976	89.3	41.8	0.697	34.2	3.8	6.5	333.6	3,548
1977	84.8	38.5	0.742	32.2	3.8	6.2	335.3	3,796
1978	83.9	40.8	0.740	33.5	3.8	6.7	353.4	3,903
1979	86.3	45.5	0.742	35.5	4.1	7.2	372.8	3,942
1980	87.1	43.3	0.731	39.6	3.9	6.7	368.8	3,533

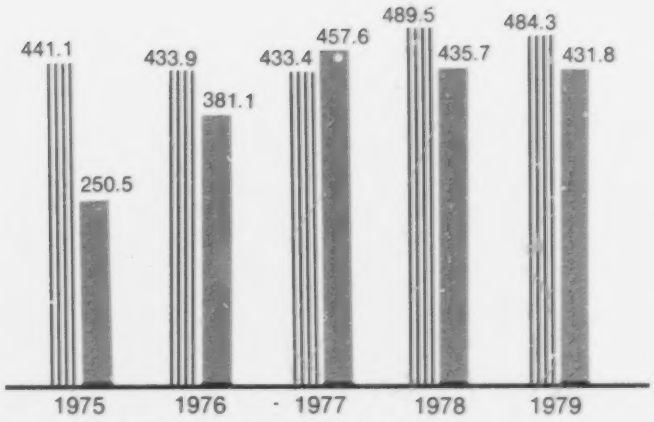
Source: Statistisches Bundesamt, Germany

U.S.A.

ENERGY



Crude Oil and Petroleum Products (in MTOE*)



Source: International Energy Agency, OECD

Energy Supply and Requirements (in MTOE*)

Type of fuel	1975	1976	1977	1978	1979
Production	1,383.0	1,394.7	1,401.3	1,458.0	1,522.3
Solid fuels	373.9	389.8	396.4	378.6	440.8
Crude oil & petroleum products	441.1	433.9	433.4	489.5	484.3
Gas	456.9	453.6	452.1	450.3	459.2
Nuclear power	41.4	47.9	64.0	70.2	66.6
Hydro- & geotherm. energy	69.7	69.4	55.4	69.4	71.5
Imports	346.4	406.4	485.4	465.3	466.7
Exports	-50.7	-46.7	-44.8	-38.2	-55.0
Total energy requiements	1,629.6	1,732.9	1,778.4	1,876.0	1,871.0

Source: International Energy Agency, OECD

Consumption by Fuel and Sector (in MTOE*)

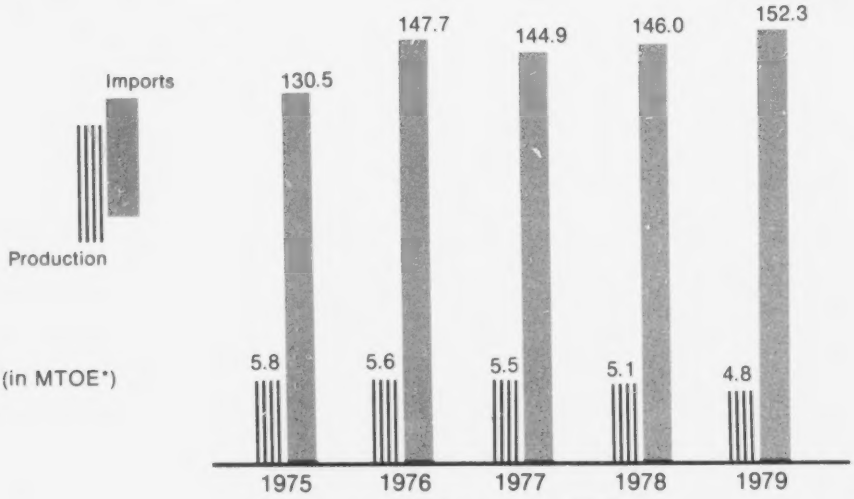
Fuel	Year	Total	Industry	Trans-portation	Other, incl. residential & commercial	Electricity generation (in GWh**)
Solid fuels	1975	81.0	76.2	-	4.9	1,001,825
	1978	82.4	76.9	-	5.5	1,078,681
	1979	83.8	78.9	-	4.8	1,113,186
Oil & petroleum products	1975	654.8	78.7	411.8	164.3	339,322
	1978	815.5	137.6	471.9	205.8	401,579
	1979	801.0	152.3	459.4	189.4	414,423
Gas	1975	323.3	146.4	-	176.9	352,082
	1978	325.3	140.3	-	184.9	336,993
	1979	329.5	141.7	-	187.9	347,772
Other, incl. nuclear, hydro- & geotherm. energy	1975	152.4	55.6	0.3	96.5	492,438
	1978	175.9	70.0	0.3	105.6	582,945
	1979	178.7	71.2	0.3	107.2	561,558

Source: International Energy Agency, OECD

*MTOE = millions of tons of oil equivalent
**GWh = giga-Wh = billions of watt-hours

GERMANY

ENERGY



Crude Oil and Petroleum Products (in MTOE*)

Source: International Energy Agency, OECD

Energy Supply and Requirements (in MTOE*)

Type of fuel	1975	1976	1977	1978	1979
Production	119.8	119.0	118.2	118.2	122.3
Solid fuels	92.0	89.5	85.2	84.3	87.4
Crude oil & petroleum products	5.8	5.6	5.5	5.5	4.8
Gas	14.7	14.8	14.9	16.1	16.2
Nuclear power	5.0	5.8	8.5	8.4	9.6
Hydro- & geotherm. energy	4.0	3.4	4.2	4.3	4.2
Imports	159.3	177.3	176.8	180.2	191.9
Exports	-23.1	-22.3	-22.4	-27.6	-27.3
Total energy requiements	243.9	264.2	263.0	269.6	283.8

Source: International Energy Agency, OECD

Consumption by Fuel and Sector (in MTOE*)

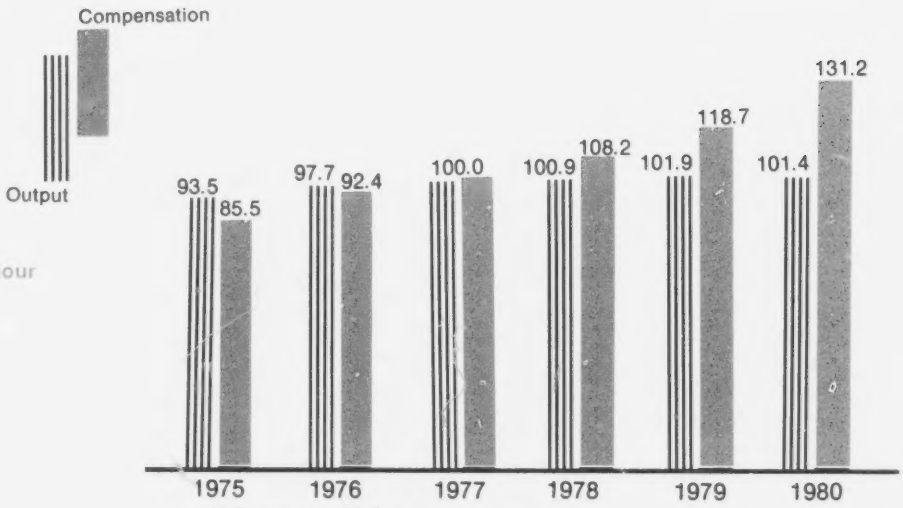
Fuel	Year	Total	Industry	Trans-portation	Other, incl. residential & commercial	Electricity generation (in GWh**)
Solid fuels	1975	23.2	15.3	0.3	7.6	171,580
	1978	20.3	15.1	0.1	5.1	201,590
	1979	22.7	16.4	0.1	6.1	212,389
Oil & petroleum products	1975	111.8	28.5	31.9	43.8	31,456
	1978	125.0	29.6	37.2	50.1	32,885
	1979	128.9	30.6	38.0	51.9	29,467
Gas	1975	24.2	15.4	-	8.8	60,257
	1978	27.6	14.3	-	13.2	64,517
	1979	32.6	16.1	-	16.5	69,534
Other, incl. nuclear, hydro- & geotherm. energy	1975	22.6	11.0	0.9	10.8	38,509
	1978	26.5	12.4	0.8	13.3	54,438
	1979	27.7	13.1	0.9	13.7	60,793

Source: International Energy Agency, OECD

*MTOE = millions of tons of oil equivalent
**GWh = giga-Wh = billions of watt-hours

U.S.A.

PRODUCTIVITY AND LABOR COSTS IN MANUFACTURING



Output and Compensation per Hour
(1977=100)

U.S. Department of Labor

Productivity (1977 = 100)

Year	Output per Hour	Compensation per Hour	Unit Labor Costs
1975	93.5	85.5	91.4
1976	97.7	92.4	94.6
1977	100.0	100.0	100.0
1978	100.9	108.2	107.3
1979	101.9	118.7	116.5
1980	101.4	131.2	129.4

Source: U.S. Department of Commerce

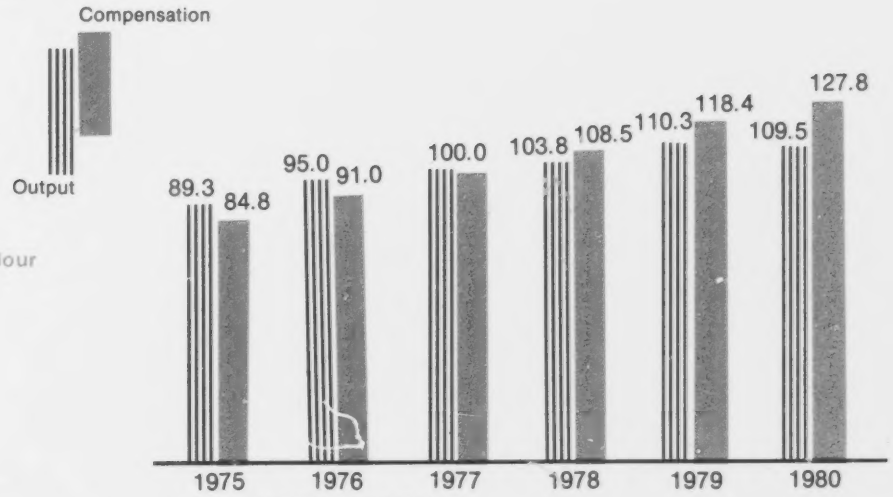
Hourly Compensation of Production Workers

Year	Average hourly earnings (in $)	Additional compensation (in % of hourly earnings)	Total compensation per hour (in $)
1975	4.83	31.4	6.35
1976	5.22	32.6	6.92
1977	5.68	33.7	7.59
1978	6.17	34.7	8.31
1979	6.69	35.5	9.06
1980	7.27	36.4	9.92

Source: U.S. Department of Labor

GERMANY

PRODUCTIVITY AND LABOR COSTS IN MANUFACTURING



Output and Compensation per Hour
(1977=100)

Source: U.S. Department of Labor

Productivity (1977 = 100)

Year	Output per Hour	Compensation per Hour	Unit Labor Costs
1975	89.3	84.8	95.0
1976	95.0	91.0	95.8
1977	100.0	100.0	100.0
1978	103.8	108.5	104.6
1979	110.3	118.4	107.4
1980	109.5	127.8	116.7

Source: U.S. Department of Commerce

Hourly Compensation of Production Workers (in DM)

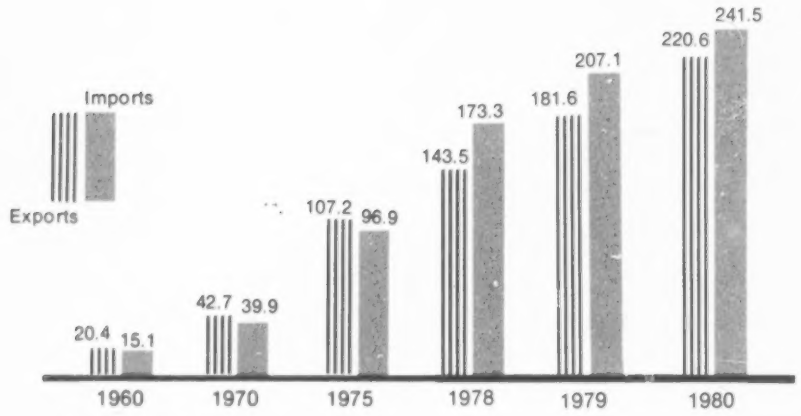
Year	Average hourly earnings (in DM)	Additional compensation (in % of hourly earnings)	Total compensation per hour (in DM)
1975	9.74	57.3	15.32
1976	10.39	59.2	16.54
1977	11.19	59.8	17.88
1978	11.76	60.8	18.91
1979	12.41	62.3	20.14
1980	13.36	63.4	21.67

Source: U.S. Department of Labor

U.S.A.

FOREIGN TRADE

Grand Total (in bil. $)



Source: U.S. Department of Commerce

By Commodity Groups (in mil. $)

Imports				Exports		
1978	1979	1980	Commodity group	1978	1979	1980
13,521	15,171	15,738	Food and live animals	18,333	22,245	27,744
2,221	2,566	2,598	Beverages and tobacco	2,293	2,337	2,663
9,334	10,650	10,165	Crude materials inedible	15,553	20,755	23,791
42,105	60,061	78,756	Mineral fuels and lubricants	3,878	5,616	7,982
511	740	539	Oils and fats	1,521	1,845	1,946
6,427	7,485	8,402	Chemicals	12,618	17,306	20,740
27,237	30,065	32,250	Manufactured goods by chief material	12,466	16,236	22,255
47,626	53,678	60,659	Machinery and transport equipment	59,270	70,491	84,628
19,062	21,006	23,666	Miscellaneous manufactured articles	10,191	12,643	16,347
4,018	4,905	7,170	Items not classified by kind	5,030	9,103	8,496
173,272	207,077	241,461	Total	143,460	181,646	220,623

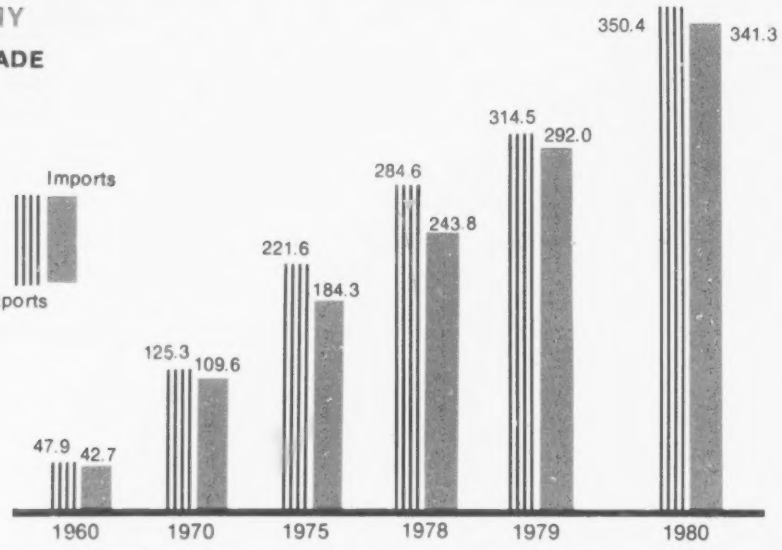
Source: U.S. Department of Commerce

Major Partners (in %)	1978	1979	1980
IMPORTS:			
1. Canada	19.3	18.3	17.0
2. Japan	14.1	12.7	12.8
3. Mexico	3.5	4.3	5.2
4. Saudi Arabia	3.1	3.9	5.2
5. Germany	5.7	5.4	4.9
EXPORTS:			
1. Canada	19.8	18.2	16.0
2. Japan	9.0	9.7	9.4
3. Mexico	4.7	5.4	6.9
4. United Kingdom	5.0	5.8	5.8
5. Germany	4.9	4.7	5.0

Source: U.S. Department of Commerce

GERMANY

FOREIGN TRADE



Grand Total (in bil. DM)

Source: Statistisches Bundesamt, Germany

By Commodity Groups (in mil. DM)

Imports				Exports		
1978	1979	1980	Commodity Group	1978	1979	1980
29,995	30,650	33,257	Food and live animals	11,006	12,590	15,108
2,859	3,091	3,405	Beverages and tobacco	1,417	1,620	1,795
19,691	23,091	26,507	Crude materials, inedible	5,400	6,565	7,179
39,342	56,729	76,106	Mineral fuels and lubricants	9,123	10,613	13,225
1,259	1,531	1,445	Oils and fats	1,366	1,504	1,541
17,582	22,697	24,164	Chemicals	33,725	41,043	44,130
46,024	54,151	61,023	Manufactured goods by chief material	57,258	64,109	71,190
50,219	56,372	63,720	Machinery and transport equipment	132,754	141,087	155,254
29,678	34,079	39,446	Miscellaneous manufactured articles	26,688	29,325	32,645
7,234	9,769	12,186	Items not classified by kind	5,836	6,164	8,339
243,844	292,040	341,259	Total	284,573	314,469	350,400

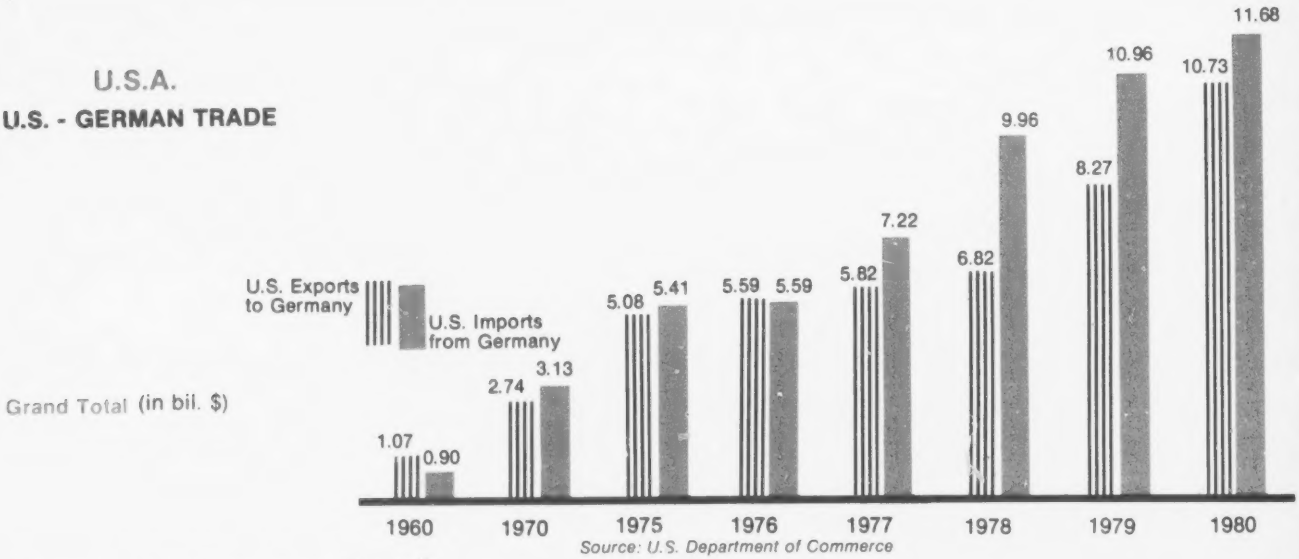
Source: Statistisches Bundesamt, Germany

Major Partners (in %)	1978	1979	1980
IMPORTS:			
1. Netherlands	12.6	12.3	11.5
2. France	11.6	11.4	10.7
3. Italy	9.5	8.8	7.9
4. United States	7.2	6.9	7.5
5. Belgium-Luxembourg	8.4	8.0	7.2
EXPORTS:			
1. France	12.3	12.7	13.3
2. Netherlands	10.0	10.0	9.5
3. Italy	6.8	7.8	8.5
4. Belgium-Luxembourg	8.3	8.5	7.8
5. United Kingdom	5.9	6.7	6.5

Source: Statistisches Bundesamt, Germany

U.S.A.

U.S. - GERMAN TRADE



Source: U.S. Department of Commerce

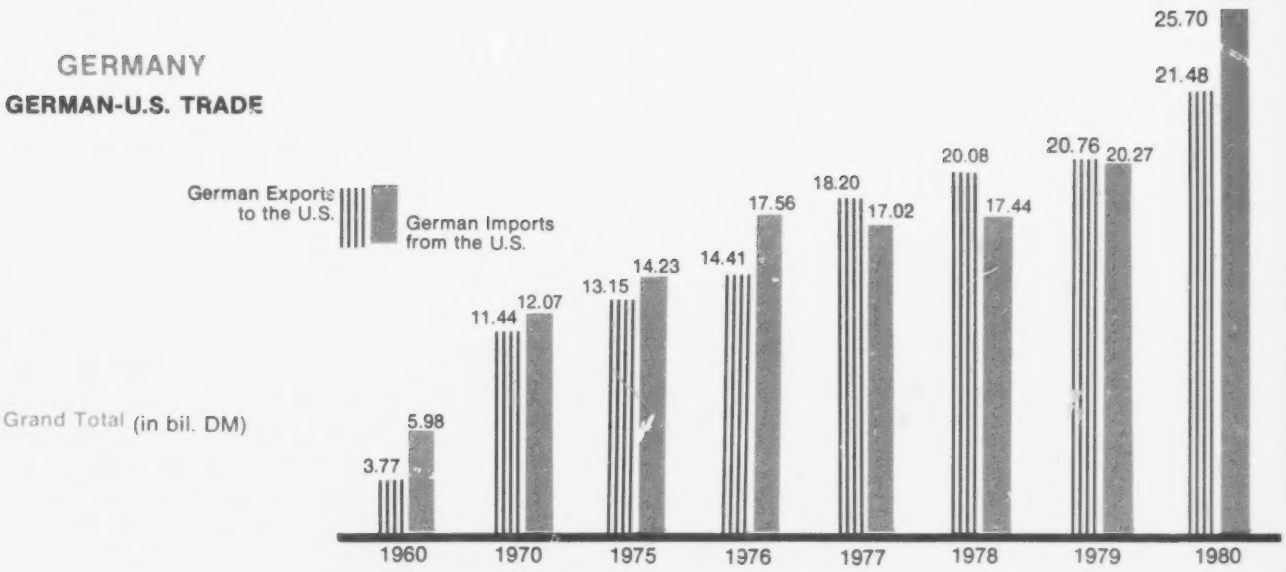
Major Items of U.S.—German Trade (in mil.$)

U.S. Exports to Germany				U.S. Imports from Germany		
1978	1979	1980		1978	1979	1980
6,815	8,272	10,732	Total	9,961	10,955	11,681
8,724*	11,081*	14,161*		10,087*	11,337*	11,821*
835.7	746.1	951.1	Food and live animals	135.9	121.9	168.8
21.1	23.8	31.2	Meat and prep.	3.2	1.5	2.5
3.1	3.9	6.4	Dairy products and eggs	5.3	6.0	16.0
20.5	26.9	19.8	Fish and prep.	3.1	1.9	1.5
281.1	198.6	223.8	Cereals and prep.	5.2	5.3	6.7
147.4	171.0	291.3	Fruits and vegetables	13.3	19.1	34.3
341.9	300.5	361.6	Animal feeding-stuffs	8.2	7.6	6.6
3.1	2.0	3.1	Coffee, cocoa, spices and prep.	77.6	43.1	69.3
117.6	149.5	246.0	Beverages and tobacco	136.3	135.5	145.5
-	-	-	Beer	31.5	39.3	43.4
-	0.1	2.0	Wine	100.7	91.2	97.3
9.5	9.3	9.7	Alcoholic beverages, distilled	2.0	1.7	2.1
108.0	140.0	234.1	Tobacco, raw and manufactured	1.4	1.5	2.1
939.4	1,225.2	1,500.3	Crude materials, inedible, exc. fuel	63.2	90.9	130.1
57.8	90.5	102.9	Hides, skins and furskins undressed	2.7	4.7	3.4
380.4	346.0	398.5	Soybeans	-	-	-
28.3	51.3	66.9	Rubber, incl. synthetic and reclaimed	2.2	2.2	3.3
102.7	133.5	134.6	Wood, lumber and cork	0.6	0.6	0.5
97.8	140.8	202.9	Pulps and waste paper	-	-	-
39.1	65.4	101.6	Raw textile fibers and their waste	11.9	10.3	11.7
65.0	74.0	84.7	Crude fertilizers and minerals	6.7	9.6	8.6
67.2	196.5	330.3	Metalliferous ores and metal scrap	22.5	52.9	88 5
24.6	60.6	112.3	Nonferrous metal scrap	14.3	36.8	64.9
16.1	17.9	18.4	Vegetable materials, crude	2.8	3.0	1.8
88.0	195.0	216.4	Mineral fuels and lubricants	325.1	224.4	26.3
37.2	134.0	136.5	Coal, coke and briquets	301.4	201.0	4.4
50.7	60.9	79.7	Petroleum and petroleum products	23.7	23.3	21.9
43.3	31.6	35.8	Oils and fats, animal and vegetable	2.7	1.3	2.5
40.8	30.3	35.0	Animal oils and fats	0.4	0.2	0.2
2.4	1.0	0.7	Vegetable oils and fats	1.0	-	1.1
572.6	765.8	850.8	Chemicals	795.4	914.5	1,019.2
309.4	449.0	396.8	Organic and inorganic chemicals	367.8	445.4	512.0
14.9	16.5	25.9	Essent. oils, perfume materials, soaps	21.3	28.5	27.6
17.5	20.4	23.4	Dyeing, tanning and coloring materials	81.1	92.4	97.2
181.5	258.8	200.5	Radioactive materials	2.6	0.7	0.2
82.5	95.2	133.1	Medicinal and pharmaceutical products	66.0	78.2	92.1
79.1	117.6	142.9	Synthetic resins and plastic materials	142.8	165.5	149.4
37.1	56.4	79.1	Other chemical products	109.3	100.5	126.7

Continued

GERMANY

GERMAN-U.S. TRADE



Source: Statistisches Bundesamt, Germany

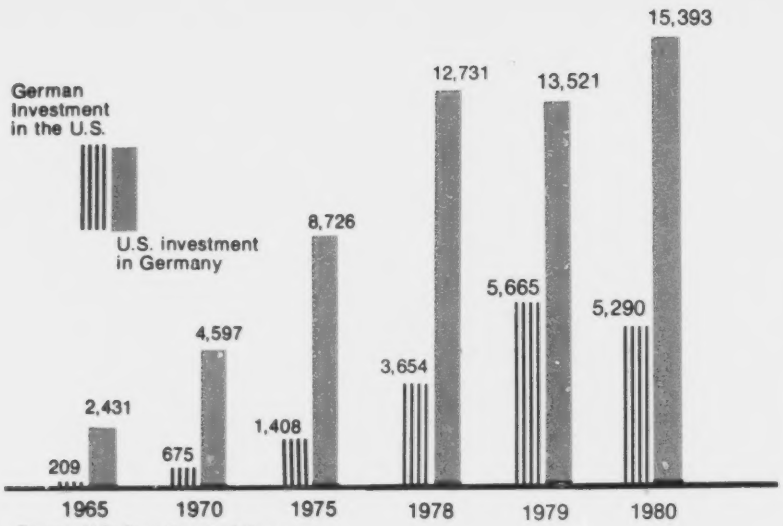
Major Items of U.S.—German Trade (in mil.$) (continued)

U.S. Exports to Germany				U.S. Imports from Germany		
1978	1979	1980		1978	1979	1980
519.5	680.0	990.9	Manufactured goods by chief material	1,579.8	1,606.8	1,493.0
10.7	17.2	24.6	Leather	14.1	18.3	18.4
4.9	7.7	9.8	Tires and tubes for tires	61.1	91.6	82.9
95.4	130.3	127.8	Textile yarn and fabrics	90.6	86.0	90.7
48.2	60.7	77.1	Wood and cork	5.8	7.0	6.8
79.5	105.3	142.9	Paper and paperboard	41.6	25.1	21.0
19.0	25.8	47.2	Iron and steel	716.0	690.6	557.1
86.6	117.0	295.7	Nonferrous metals	211.5	205.4	202.4
108.0	141.7	180.7	Metal manufactures	236.6	260.4	284.1
28.6	30.4	30.4	Glass	47.1	41.8	43.9
9.6	10.3	13.5	Glassware	39.4	40.5	39.5
1.0	1.7	2.7	Pottery	54.5	70.5	68.4
2,645.4	3,275.7	3,916.4	Machinery and transport equipment:	5,985.4	6,849.1	7,562.9
1,326.4	1,658.9	2,147.4	Machines, exc. electrical	2,262.4	2,600.2	2,956.6
583.3	759.1	987.0	Electrical machines and apparatus	435.0	541.9	644.7
735.7	857.7	782.0	Transport equipment	3,288.0	3,707.0	3,961.6
51.5	56.8	74.2	—Metalworking machinery	213.6	277.4	334.2
605.5	830.3	1,083.4	—Office machines	216.1	213.5	195.1
40.5	51.0	50.7	—Agricultural machines	112.6	185.4	199.4
28.6	38.2	42.0	—Textile and leather machinery	256.9	242.5	249.2
167.5	213.8	291.5	—Other machs. for spec. industries	515.7	574.4	679.1
242.9	288.5	374.6	—Other machinery	485.7	574.9	689.3
152.9	172.6	212.8	—Telecommunications apparatus	70.7	74.3	84.4
54.6	81.3	97.2	—El. medical and radiolog. apparatus	86.2	88.4	113.9
222.1	323.6	230.3	—Road motor vehicles and parts	3,250.7	3,662.9	3,889.0
513.5	511.3	533.0	—Aircraft and spacecraft and parts	25.7	25.7	48.8
696.5	962.1	1,631.0	Miscellaneous manufactured articles:	745.0	783.6	890.6
32.0	50.0	72.0	Clothing and accessories	32.2	30.4	22.9
1.8	3.2	4.5	Footwear	23.0	13.4	16.2
290.7	364.3	482.6	Prof., scientific and controlling instruments	196.2	237.5	277.4
153.1	176.8	210.6	Photo and motion picture supplies	77.5	61.7	52.7
4.9	4.3	3.4	Watches and clocks	53.3	53.3	52.0
31.6	54.6	68.1	Sound recorders, musical instruments	33.2	39.6	38.5
16.0	22.4	26.0	Printed matter	41.7	33.8	36.9
30.1	41.5	52.3	Rubber and plastic manufactures	87.0	97.5	116.1
66.7	98.2	116.1	Toys, sporting goods, baby carriages	31.1	34.1	38.6
24.0	80.2	511.9	Artworks, collectors pieces, antiques	28.1	32.0	61.3
7.7	9.7	14.6	Jewelry	21.2	23.8	22.5
278.5	158.9	256.5	Items not classified by kind	191.9	227.4	242.3

Source: U.S. Department of Commerce
**Statistisches Bundesamt, Germany*

U.S.A.

DIRECT INVESTMENT



Source: U.S. Department of Commerce

U.S. Direct Investment Abroad (in mil. $)
(cumulative, book value at year end)

	1976	1977	1978	1979	1980
Total	136,809	149,848	167,804	186,760	213,468
By country:					
1. Canada	33,932	35,200	37,081	40,243	44,640
2. United Kingdom	15,137	17,434	20,416	23,539	28,099
3. Germany	10,497	11,071	12,731	13,521	15,393
4. Switzerland	5,762	6,101	7,394	9,699	11,276
5. Bermuda	3,869	-	7,204	9,906	10,874
6. Other countries	67,612	80,042	82,978	89,852	103,186
By industry:					
1. Petroleum	28,408	31,420	33,790	38,744	46,920
2. Finance, insurance and real estate	16,715	20,327	24,041	31,523	34,405
3. Trade	13,610	14,744	17,340	22,677	25,752
4. Machinery	17,091	18,655	21,123	20,924	23,299
5. Chemicals	12,183	13,466	16,026	16,878	19,044
6. Other industries	48,802	51,236	55,484	56,014	64,048

Source: U.S. Department of Commerce

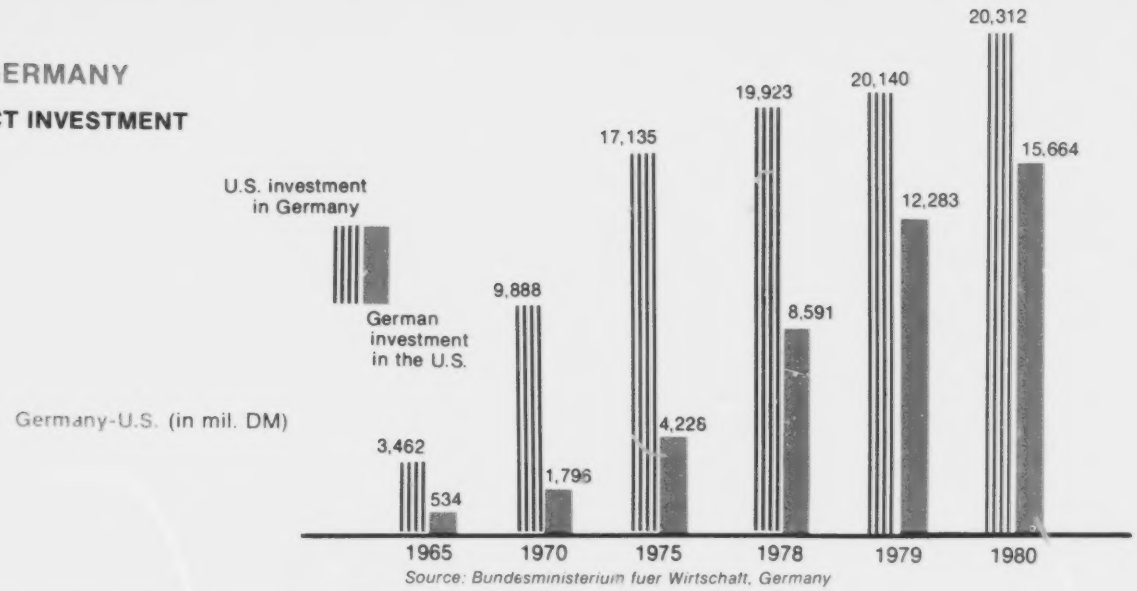
Foreign Direct Investment in the U.S.A. (in mil. $)
(cumulative, book value at year end)

	1976	1977	1978	1979	1980
Total	30,770	34,595	42,471	54,462	65,483
By country:					
1. Netherlands	6,255	7,830	10,078	12,672	16,159
2. United Kingdom	5,802	6,397	7,638	9,796	11,342
3. Canada	5,907	5,650	6,180	7,154	9,810
4. Germany	2,097	2,529	3,654	5,665	5,290
5. Japan	1,178	1,755	2,749	3,493	4,219
6. Other countries	9,531	10,434	12,172	15,682	18,663
By industry:					
1. Trade	6,123	7,237	9,161	11,562	13,772
2. Petroleum	5,921	6,573	7,762	9,906	12,253
3. Finance and insurance	3,943	4,544	5,231	7,575	9,889
4. Chemicals	4,347	5,092	6,094	7,212	7,859
5. Food products	1,693	1,826	2,260	2,611	4,092
6. Other industries	8,743	9,323	11,963	15,596	17,618

Source: U.S. Department of Commerce

GERMANY

DIRECT INVESTMENT



Source: Bundesministerium fuer Wirtschaft, Germany

German Direct Investment Abroad (in mil. DM)
(cumulative, book value at year end)

	1976	1977	1978	1979	1980
Total:	47,048	52,142	58,193	66,002	74,162
By country:					
1. United States	5,366	6,705	8,591	12,283	15,664
2. Belgium-Luxembourg	4,697	5,175	5,748	6,247	7,275
3. France	4,675	5,088	5,632	6,354	6,807
4. Switzerland	4,581	4,762	5,153	5,290	5,833
5. Brazil	3,451	4,039	4,463	4,996	5,359
6. Other countries	24,278	26,373	28,606	30,832	33,224
By industry:					
1. Chemicals	8,801	9,389	10,056	10,481	11,232
2. Finance and insurance	4,585	5,424	6,381	8,063	9,444
3. Electrical engineering	4,948	5,618	5,930	6,786	7,391
4. Iron and steel	3,859	4,061	4,779	5,643	5,867
5. Mechanical engineering	3,769	4,042	4,480	5,027	5,835
6. Other industries	21,186	23,606	26,567	30,002	34,393

Source: Bundesministerium fuer Wirtschaft, Germany

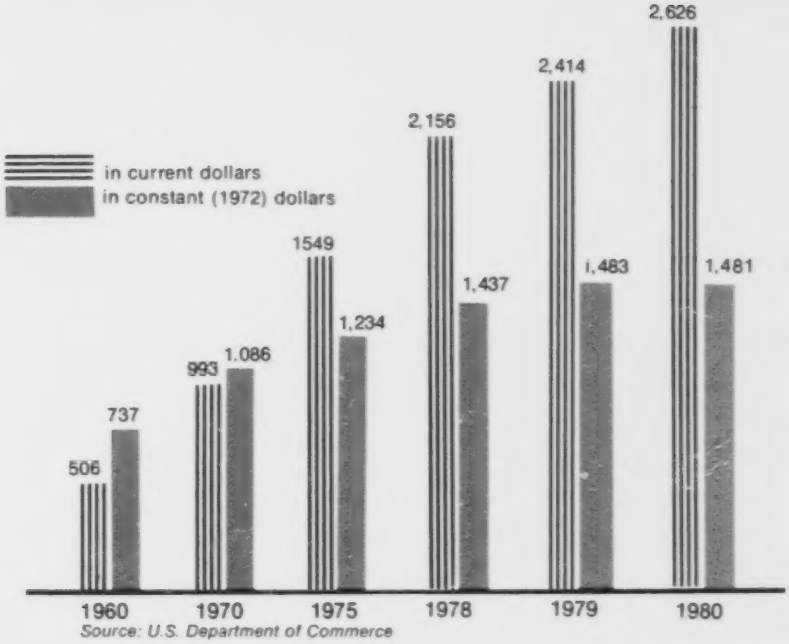
Foreign Direct Investment in Germany (in mil. DM.)
(cumulative, book value at year end)

	1976	1977	1978	1979	1980
Total	45,518	49,253	53,326	55,242	57,616
By country:					
1. United States	17,893	19,049	19,923	20,140	20,312
2. Switzerland	7,261	7,962	8,338	8,595	8,683
3. Netherlands	5,848	6,316	6,308	6,666	7,240
4. United Kingdom	4,409	4,771	5,492	5,855	6,764
5. France	2,578	2,884	3,158	3,245	3,420
6. Other countries	7,529	8,271	10,107	10,741	11,197
By industry:					
1. Holding companies	4,935	5,214	6,569	6,870	6,885
2. Petroleum	5,954	6,328	6,636	6,377	6,676
3. Finance and insurance	3,503	4,573	4,840	5,235	6,046
4. Chemicals	3,807	3,964	4,314	5,391	5,609
5. Electrical engineering	4,073	4,405	4,651	4,659	5,152
6. Other industries	23,246	24,769	26,316	26,824	27,248

Source: Bundesministerium fuer Wirtschaft, Germany

U.S.A.

GROSS NATIONAL PRODUCT
(in bil. $)



Source: U.S. Department of Commerce

GNP by Type of Expenditure
(at current prices)

Period	Gross national Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	506.0	+ 4.9	324.9	100.2	76.4	4.4
1970	992.7	5.2	621.7	220.1	144.2	6.7
1971	1,077.6	8.6	672.2	234.9	166.4	4.1
1972	1,185.9	10.1	737.1	253.1	195.0	0.7
1973	1,326.4	11.8	812.0	270.4	229.8	14.2
1974	1,434.2	8.1	888.1	304.1	228.7	13.4
1975	1,549.2	8.0	976.4	339.9	206.1	26.8
1976	1,718.0	10.9	1,084.3	362.1	257.9	13.8
1977	1,918.0	11.6	1,205.5	394.5	322.3	-4.2
1978	2,156.1	12.4	1,348.7	432.6	375.3	-0.6
1979	2,413.9	12.0	1,510.9	473.8	415.8	13.4
1980	2,626.1	9.8	1,672.8	534.7	395.3	23.3

Source: U.S. Department of Commerce

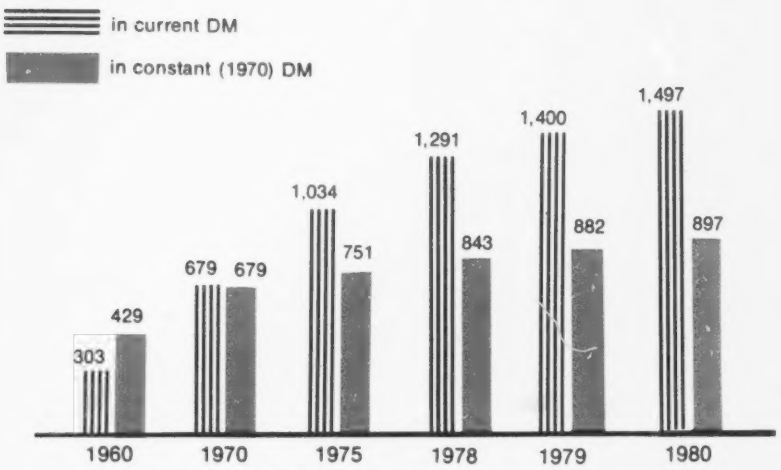
GNP by Type of Expenditure
(at constant 1972 prices)

Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	736.8	2.3	453.0	172.9	105.4	5.5
1970	1,085.6	-0.2	672.1	251.1	158.6	3.9
1971	1,122.4	3.4	696.8	250.1	174.0	1.6
1972	1,185.9	5.7	737.1	253.1	195.0	0.7
1973	1,255.0	5.8	768.5	253.5	217.6	15.5
1974	1,248.0	-0.6	763.6	261.2	195.5	27.8
1975	1,233.9	-1.1	780.2	266.7	154.8	32.2
1976	1,300.4	5.4	823.7	266.8	184.5	25.4
1977	1,371.7	5.5	863.9	272.3	213.5	21.9
1978	1,436.9	4.8	904.8	277.8	229.7	24.6
1979	1,483.0	3.2	930.9	281.8	232.6	37.7
1980	1,480.7	-0.2	935.1	290.0	203.6	52.0

Source: U.S. Department of Commerce

GERMANY

GROSS NATIONAL PRODUCT
(in bil. DM)



Source: Statistisches Bundesamt, Germany

GNP by Type of Expenditure
(at current prices)

Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	303.0	11.7	171.8	40.7	82.5	7.9
1970	679.0	13.6	367.5	108.1	189.1	14.2
1971	756.0	11.3	407.8	129.1	203.4	15.5
1972	827.2	9.4	447.7	144.0	216.9	18.5
1973	920.1	11.2	491.7	166.7	232.6	29.1
1974	986.9	7.3	527.5	194.0	221.9	43.4
1975	1,033.9	4.4	576.5	215.3	214.5	29.8
1976	1,125.0	8.7	623.6	227.2	231.9	28.6
1977	1,200.6	6.7	669.6	239.4	249.0	29.5
1978	1,290.7	7.5	713.9	257.1	273.0	37.2
1979	1,400.4	8.5	766.4	278.6	314.4	12.4
1980	1,497.5	6.9	819.5	303.4	351.0	-2.4

Source: Statistisches Bundesamt, Germany

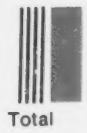
GNP by Type of Expenditure
(at constant 1970 prices)

Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	429.5	9.0	226.4	69.5	118.7	14.9
1970	679.0	5.9	367.5	108.1	189.1	14.2
1971	701.7	3.3	386.9	114.9	188.8	11.2
1972	727.3	3.6	402.2	120.3	193.7	11.1
1973	763.0	4.9	412.5	126.8	197.8	25.9
1974	765.7	0.4	413.8	132.3	177.0	42.6
1975	751.5	-2.5	425.9	138.2	165.4	23.8
1976	792.0	5.3	441.0	141.0	173.2	26.6
1977	814.5	2.8	456.3	141.8	179.9	27.0
1978	843.5	3.6	474.4	147.8	189.1	25.7
1979	881.6	4.5	490.1	152.6	204.9	14.4
1980	897.5	1.8	497.5	156.3	212.6	14.4

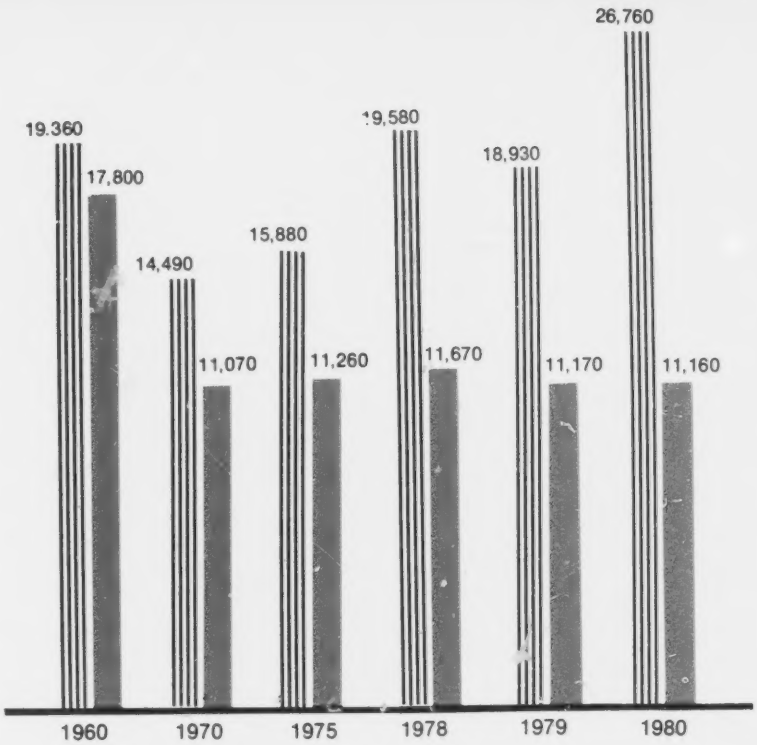
Source: Statistisches Bundesamt, Germany

U.S.A.

INTERNATIONAL TRANSACTIONS



Monetary Reserves (in mil. $)



Source: International Monetary Fund

Balance on Current Account (in bil. $)

	1960	1970	1975	1978	1979	1980
Balance on current account	2.8	2.4	18.3	-14.3	1.4	3.7
Merchandise trade	4.9	2.6	9.0	-33.8	-27.3	-25.3
Services	1.2	3.0	13.9	24.8	34.3	36.1
Transfer payments	-0.6	-1.6	- 4.6	- 5.1	- 5.6	- 7.1

Source: U.S. Department of Commerce

Currency Exchange Rates
(Value of DM in $)

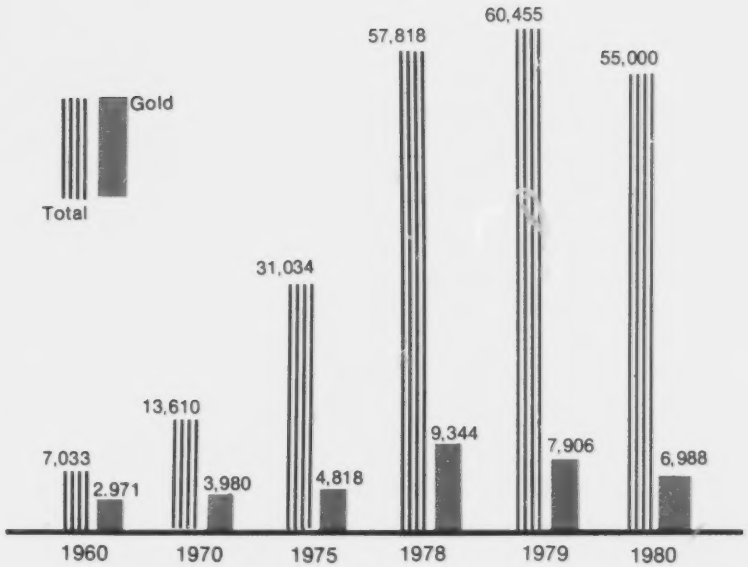
Period		Official parity		Exchange rate average
1960		0.2381		-
1970		0.2732		-
1971		0.2732	(floating May-Dec. 1971)	0.2874
1972		0.3103		0.3136
1973		0.3448	(floating from March 19,1973)	0.3761
1974		-		0.3861
1975		-		0.4060
1976		-		0.3974
1977		-		0.4308
1978		-		0.4987
1979		-		0.5456
1980		-		0.5509
1981,	Jan.	-		0.4977
	Feb.	-		0.4676
	March	-		0.4750
	Apr.	-		0.4622
	May	-		0.4360
	June	-		0.4205

Source: Federal Reserve System
International Monetary Fund

GERMANY

INTERNATIONAL TRANSACTIONS

Monetary Reserves (in mil. $)



Source: International Monetary Fund

Balance on Current Account (in bil. DM)

	1960	1970	1975	1978	1979	1980
Balance on current account	4.8	3.2	9.9	18.4	- 9.6	-29.8
Merchandise trade	5.2	15.7	37.3	43.2	22.6	9.0
Services	3.2	- 1.1	- 8.3	- 7.4	-11.5	-14.7
Transfer payments	-3.5	- 9.8	-17.9	-17.4	-20.7	-24.0

Source: Deutsche Bundesbank

Currency Exchange Rates
(Value of $1.00 in DM)

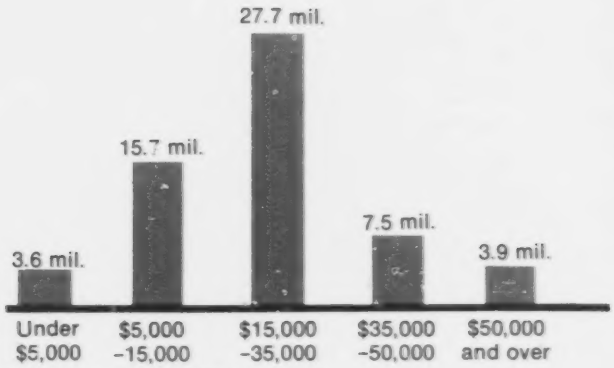
Period	Official parity		Exchange rate average
1960	4.2000		-
1970	3.6600		-
1971	3.6600	(floating May-Dec. 1971)	3.4795
1972	3.2225		3.1889
1973	2.9003	(floating f[illegible] March 19,1973)	2.6590
1974	-		2.5897
1975	-		2.4631
1976	-		2.5173
1977	-		2.3217
1978	-		2.0084
1979	-		1.8330
1980	-		1.8158
1981, Jan.	-		2.0076
Feb.	-		2.1436
March	-		2.1087
Apr.	-		2.1602
May	-		2.2915
June	-		2.3758

Source: Deutsche Bundesbank

U.S.A.

HOUSEHOLD AND FAMILY ACCOUNTS

Family income Distribution in 1980
(Families, total: 58.4 mil.)



Source: U.S. Department of Commerce

Urban Family Budgets 1980

	Lower budget (retired couple)		Intermediate budget (4 persons)		Higher budget (4 persons)	
	$	%	$	%	$	%
Total:	9,434	100	23,134	100	34,409	100
Income taxes	-	-	3,781	16.3	7,924	23.0
Social Security Taxes	-	-	1,427	6.2	1,608	4.7
Food	2,772	29.4	5,571	24.1	7,024	20.4
Housing	3,106	32.9	5,106	22.1	7,747	22.5
Transportation	950	10.1	2,116	9.1	2,751	8.0
Clothing, personal care	665	7.0	1,763	7.6	2,556	7.4
Health care	950	10.1	1,303	5.6	1,359	3.9
Other costs	991	10.5	2,067	8.9	3,440	10.0

Source: U.S. Department of Labor

Households Owning Selected Durables (in % of total households)

	1970	1975	1979	1980
One or more cars	43.3*	49.7*	53.4*	54.2*
TV set, black & white	98.7	99.9	99.9	-
Color TV	42.5	74.4	89.8	-
Refrigerator	99.8	99.9	99.9	-
Freezer	31.2	43.5	44.7	-
Washing machine, automatic	62.1	68.4	77.3	-
Telephone	92.0	95.0	97.0	97.5

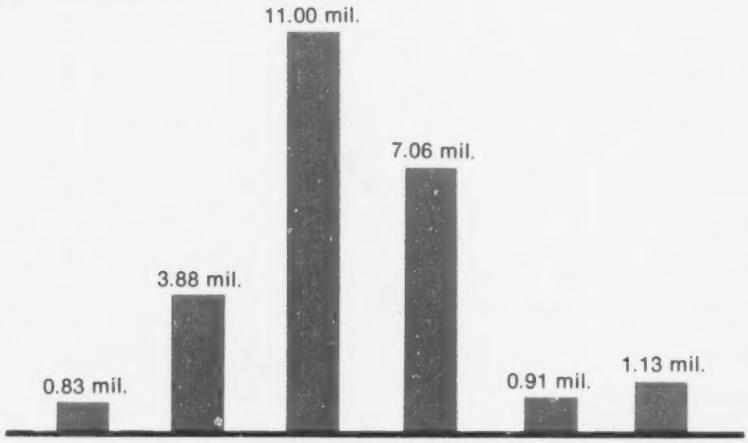
Source: U.S. Department of Commerce
Merchandising, Gralla Publications
Motor Vehicle Manufacturers Association

*Number of cars per 100 population

GERMANY

HOUSEHOLD AND FAMILY ACCOUNTS

Household Income Distribution in 1980
(Households total: 24.8 mil.)



Source: Statistisches Bundesamt, Germany

Urban Household Budgets 1980

	Lower budget (retired couple)		Intermediate budget (4 persons)		Higher budget (4 persons)	
	DM	%	DM	%	DM	%
Total:	16,174	100	46,171	100	74,468	100
Income taxes	-	-	4,794	10.4	11,177	15.0
Social Security Taxes	-	-	5,465	11.8	3,395	4.6
Food	4,701	29.1	8,232	17.8	10,013	13.4
Housing	5,610	34.7	9,467	20.5	14,413	19.4
Transportation	1,012	6.3	4,094	8.9	6,953	9.3
Clothing, personal care	952	5.9	2,729	5.9	4,229	5.7
Health care	688	4.3	873	1.9	2,798	3.8
Other costs	3,211	19.9	10,517	22.8	21,490	28.9

Source: Statistisches Bundesamt, Germany

Households Owning Selected Durables (in % of total households)

	1970	1975	1979	1980
One or more cars	51.0	74.3	81.9	82.2
TV set, black & white	89.4	81.5	58.3	57.1
Color TV	3.5	29.3	69.2	73.8
Refrigerator	94.4	98.7	88.0	84.0
Freezer	18.5	52.2	66.7	63.4
Washing machine, automatic	37.5	57.6	75.6	78.8
Telephone	19.9	46.8	81.2	86.4

Source: Statistisches Bundesamt, Germany

Information Sources . . .

Government

Embassy of the Federal Republic of Germany
4645 Reservoir Road N.W.; Washington, D.C., 20007.

German Information Center
410 Park Avenue, New York, N.Y., 10022.

Embassy of the United States of America
53 Bonn-Bad Godesberg; Mehlemer Aue.

Bundesminister fuer Wirtschaft
53 Bonn-Duisdorf; Villemomblerstr. 76 -Ministry of Economic Affairs.

Bundesminister der Finanzen
53 Bonn 1; Graurheindorferstr. 108 - Ministry of Finance (incl. Department for Customs & Duties).

Presse-und Informationsamt der Bundesregierung
53 Bonn 1; Welckerstr. 11 - Public Relations Department of the Federal Government.

Statistisches Bundesamt
62 Wiesbaden; Gustav Stresemann Ring 11 - Federal Department of Documentation and Statistics.

Deutsches Patentamt
8 Muenchen 22; Zweibrueckenstr. 12 - Commissioner of Patents.

Bundeskartellamt
1 Berlin 61; Mehringdamm 129 - Federal Antitrust Agency.

Deutsche Bundesbank
6 Frankfurt/Main 50; Wilhelm-Epstein-Strasse 14 - German Federal Reserve Bank.

Public Authorities

Deutscher Normenausschuss
1 Berlin 30; Burggrafenstr. 4-7 - Determination Committee for Industrial Standards.

Bundesanstalt fuer Arbeit
85 Nuernberg; Regensburgerstr. 104 - Federal Employment Agency.

Binational Institutions

German American Chamber of Commerce
Main Office: 666 Fifth Ave, New York, N.Y. 10103. Branches: 2 Houston Center, Houston, Texas, 77010; Suite 2701, Peachtree Center, Harris Tower, 233 Peachtree Street NE, Atlanta, Ga. 30303; 1 Farragut Square South, Washington, D.C. 20006. Regional Chambers: 77 Monroe Street, Chicago, Ill. 60603; 465 California Street, Suite 1228, San Francisco, Calif. 94104; 3250 Wilshire Blvd.. Los Angeles, Calif., 90016.

European Community Information Service
2100 M Street N.W.; Washington, D.C., 20037.

Industrial and Trade Associations

Bundesverband der Deutschen Industrie
5 Koeln 51; Oberlaenderufer 84-88 - Association of German Industries.

Bundesvereinigung der deutschen Arbeitgeberverbaende e.V.
5 Koeln 51; Oberlaenderufer 72 - Umbrella Association of employers' organizations; counterparts of the Umbrella Organization of Labor Unions.

Deutscher Industrie- und Handelstag
53 Bonn 1; Adenauerallee 148 - Association of German Chambers of Industry and Commerce.

DGB Deutscher Gewerkschaftsbund Bundesvorstand
4 Duesseldorf 30; Hans Boecklerstr. 39 - Umbrella Organization of Labor Unions.

Bundesverband des deutschen Gross-und Aussenhandels
53 Bonn; Kaiser - Friedrich Str. 13 - Umbrella Organization of exporters/importers and wholesalers.

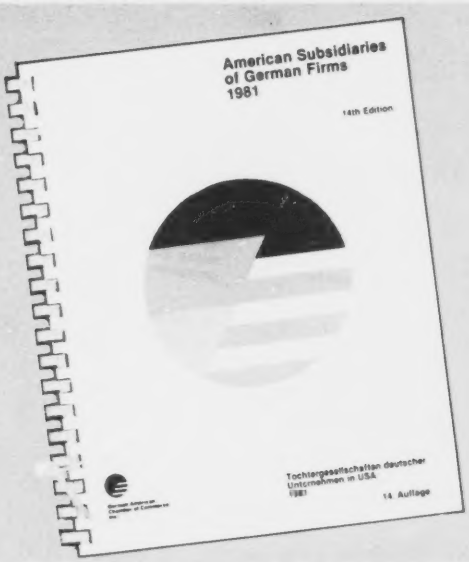
Hauptgemeinschaft des deutschen Einzelhandels e.V.
5 Koeln 1; Sachsenring 89 - Retailer Association.

Centralvereinigung deutscher Handelsvertreter und Handelsmaklerverbaende
5 Koeln 41; Geleniusstr. 1 - Umbrella Association of brokers, agents and representatives.

Gesamtverband der deutschen Versicherungswirtschaft
5 Koeln 1; Ebertplatz 1 - Association of the Insurance Industry.

Zentralausschuss der Werbewirtschaft e.V.
53 Bonn - Bad Godesberg; Villichgasse 17 - Association of Advertising Agencies and Public Relations.

Ausstellungs- und Messeausschuss der deutschen Wirtschaft e.V. [AUMA]
5 Koeln 1; Lindenstrasse 8 - Organization of Congresses and Trade Fairs.



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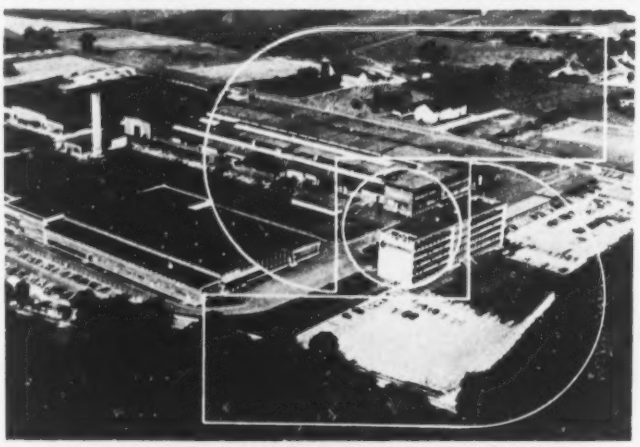

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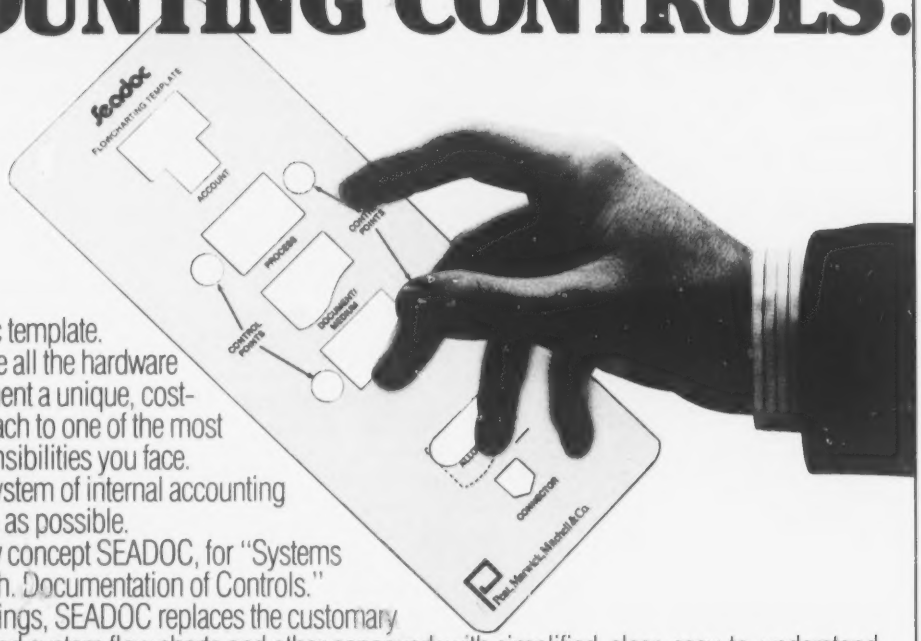

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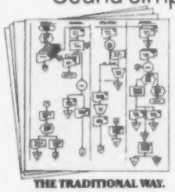

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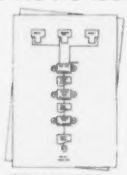

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Our 116 institutions of higher learning put education within every Floridian's reach. And 44 vocational training centers respond to local industries' needs.

BONUS #6
Florida has 16,000 manufacturing plants and gained 199,100 new jobs in 1979.
It's a big market, with the support services you need. No other southeastern state has as many manufacturing plants. And Florida leads the region in retail sales.

BONUS #7
Florida recorded more than $16 billion worth of international trade in 1980.
Florida has five foreign trade zones and 65 financial institutions which provide international service. One city hosts offices of more than 100 multinational firms. Florida links your business to worldwide opportunities.

BONUS #8
Florida has excellent air and water transportation facilities.
Our famous coastline boasts 27 ports. Among the advantages of our eight international airports are nonstop flights to Europe, South America and major U.S. cities.

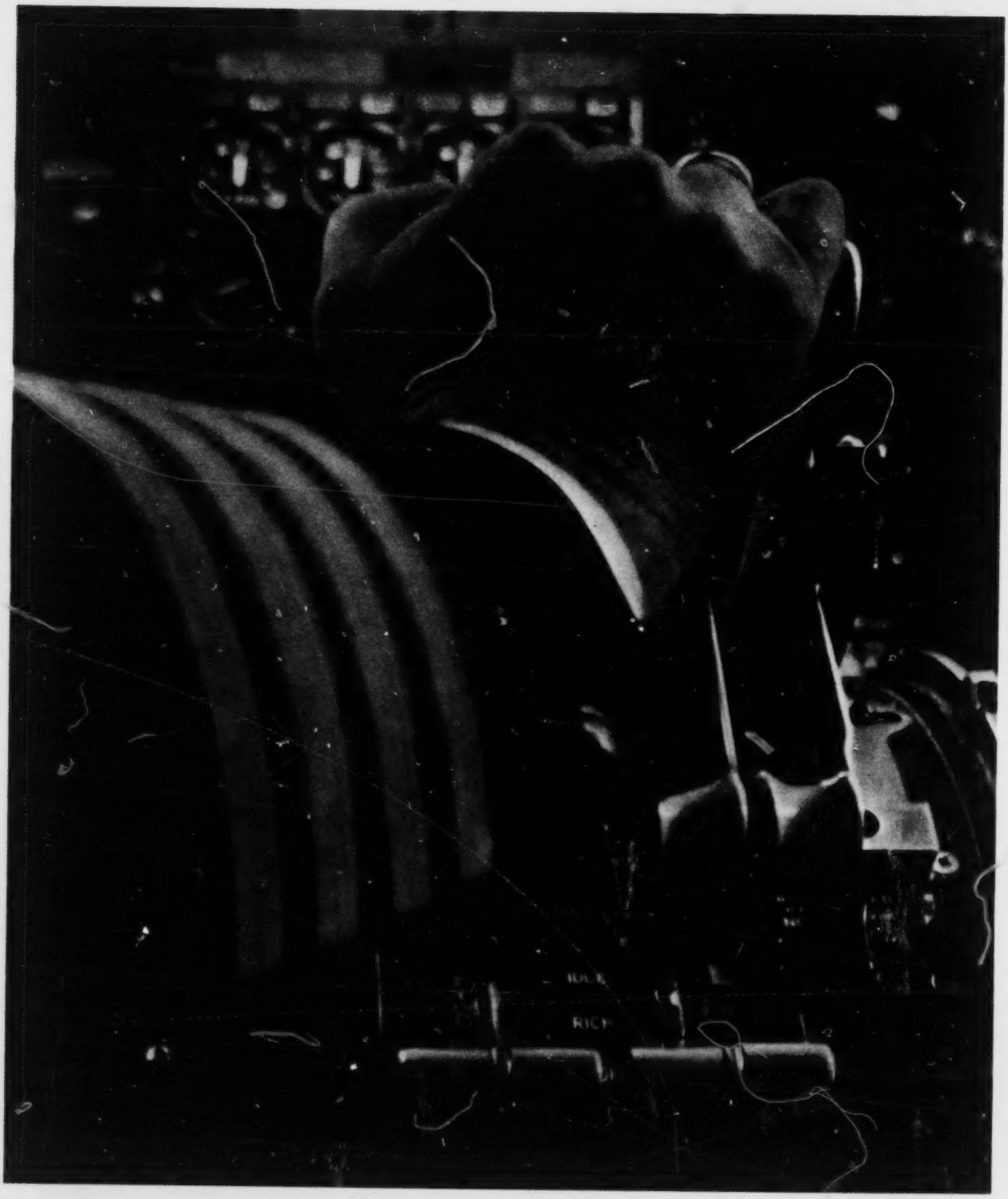
BONUS #9
People like to work where they like to live.
Aside from the low cost of living, Floridians enjoy a high quality of life. You don't need statistics to know that living well is the best work incentive.

BONUS #10
You'll like Florida's warm welcome.
The Division of Economic Development will help you find the right site, smooth the location process and make you feel right at home.

There's much more to know about Florida. For details on the industrial development program that could mean big bonuses for your company, write on your letterhead to: Steve Mayberry, Director; Florida Department of Commerce; Division of Economic Development; Suite 1G, Collins Building; Tallahassee, Florida 32301. Phone 904-488-5507. Telex TWX 810-931-3655. DECOMED TAS

FLORIDA

People like to work where they like to live.



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See your Travel Agent or Cargo Agent.